American Foundryman

A PUBLICATION PRESENTING ASSOCIATION AND CHAPTER ACTIVITIES

November
1942

Training Only Manpower Solution

THERE have been great changes in the technique of the foundry in recent years . . . but there still is need for skilled workers, and the supply is constantly diminishing.

It must be clear to any foundry manager that he cannot hope to retain his skilled or semi-skilled help much longer if such workers are within the age limits of the draft.

What is the answer? There is but one. TRAINING.

The necessity of supplying manpower to the armed services is forcing the Government more and more to call upon the younger men in industry to enter the service. While deferments have been granted to skilled men, these are only **deferments** to enable employers to prepare replacements . . . train replacements.*

There is no excuse for any foundry that has not carefully considered its future manpower and has not prepared plans for the replacement of those who are sure to be called into service. To rely upon being able to retain help because a plant is in war work 100 per cent is the height of folly, if there is any other possible way of supplying the help needed.

It may be asked: "Where can trainees be procured who will stay on the job when skilled and semi-skilled labor is called?"

Foundrymen must give earnest thought to the matter of diluting the skilled force and upgrading unskilled workers. Every skilled worker is a potential trainer, a group leader. The responsibility is management's to study and discover the tasks in which men of lesser skill may be used.

Complex jobs frequently can be broken down. Specialization of repetitive tasks and assignment of those tasks to those of lesser skills opens the door to that class of job applicant who was unemployable yesterday.

Any foundryman who has an on-the-job training problem should lose no time in enlisting the co-operation of the local Training Within Industry representative. The United States Government, through such men, provides some very valuable training aids, and it is the foundryman's patriotic duty to utilize them to the fullest degree so that our armed forces may not reach their objectives **too late with too little!**

Vaughan Reid

VAUGHAN REID,
Director, American Foundrymen's Association.

VAUGHAN REID, President of the City Pattern Works, Detroit, is recognized as a leader in the patternmaking industry, and was instrumental in organizing the A.F.A. Patternmaking Division, of which he is Chairman. He has served on many committees of the association, particularly those related to pattern work, conducted the patternmaking sessions at A.F.A. conventions for a number of years, and was elected a Director of A.F.A. in April, 1942. He also is a Past Chairman of the Detroit section, American Welding Society.

(*An important statement on draft deferments and manpower needs, by Maj. Gen. L. B. Hershey, Director of Selective Service, will be found in this issue on page 17.)

American Foundryman

CONTENTS

November, 1942

Volume 4 — Number 11

Published by the American Foundrymen's Association, Inc., 222 West Adams St., Chicago, Ill., for the purpose of presenting Association and Chapter activities. Published monthly. Subscription price, to members, $1.00 per year; to non-members, $1.50 per year. Single copies, 20c.

Entered as second class matter July 22, 1938, at the post office at Chicago, Illinois, under the Act of March 3, 1879.

Cast Steel Tire Cuts Maintenance Costs

By H. H. Blosjo,* Minneapolis, Minn.

This article, describing a new type of cast steel tire for use on Diesel rail locomotives, is typical of the many new applications of and field for castings being developed. In this instance, a tire consisting of steel castings cushioned by rubber insulators successfully replaced the usual rigid locomotive tire, and proved especially advantageous in the matter of wheel replacements. War production, spotlighting the work of the designing engineer in cutting production time and conserving critical materials, no doubt will develop many hitherto untouched fields for castings. In some instances, development of these fields may create entirely new markets for castings after the war.

LOCOMOTIVE and car wheels with rubber insulated tires have a large number of advantages over rigid wheels. There are two different types of designs; one stresses the rubber in shear and the other in compression. Wheels designed to stress the rubber in shear, are limited to rather light loads. A Diesel locomotive driver wheel,

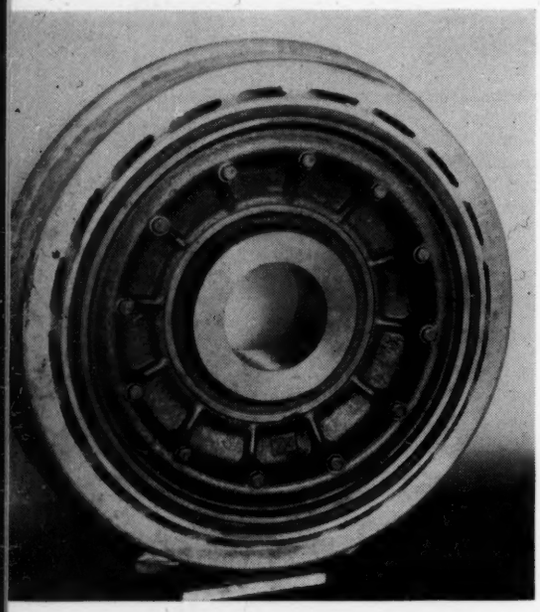


Fig. 1—Railroad locomotive driverwheel of new type, with fully insulated tire, constructed of three steel castings mounted with preformed rubber insulators. Tested with a load of 9,600 lbs., the wheel shows a displacement of the hub of only 0.015 inch.

having a fully insulated tire in which the rubber is stressed in compression, is produced by Coordinated Transportation, Inc., of Minneapolis (Fig. 1).

The wheel consists of three steel castings: The tire and the two retainer castings, one of them integral with the hub. Between these retainer castings and the tire are mounted two preformed rubber insulators. The component parts are shown in Fig. 2. In assembling, the two rubber insulators are inserted one on each side of the tire, then the hub casting is set in place on one side and the retainer casting placed on the opposite side. The bolts are inserted and pulled tight.

A cross section through the wheel is shown in Fig. 3. The volume of the preformed rubber insulators is considerably greater than the volume of the rubber in the assembled wheel. In tightening the bolts the volume is reduced and the rubber is precompressed. The precompression can be varied by varying this volume change. Wheels that carry heavy loads have to be precompressed more than wheels carrying lighter loads.

Tire in Actual Use

The particular wheel shown in Fig. 1 is used on a 44-ton locomotive. There are 8 wheels per locomotive, with the weight equally distributed between them.

This places 11,000 lbs. on each wheel. The wheel has been tested for displacement with a load of 9,600 lbs. and shows a displacement of the hub, in relation to the tire, of 0.015 inch. This is a small displacement, but it is large enough to remove the absolute rigidity of the solid wheels.

The tire, which normally is a rolled product, is made of a steel casting. On equipment which does considerable braking, these tires are subjected to fairly high temperatures. The locomotives on which they are used are in service in yard switching. This requires the locomotive to not only brake its own weight, but that of the cars in the switch.

Heat Is Dissipated

This heats up the tire considerably and would heat the rubber insulation high enough to cause deterioration of the rubber, if the temperature of the tire were not reduced where it comes in contact with the rubber. The tire is therefore designed with cooling slots to reduce the temperature of the tire at the rubber tire face. There are 20 of these cooling slots per tire, as can be seen in Fig. 1.

The cross-section of the cooling slot can be seen in Fig. 3. The continuity of the metal between the face of the tire and

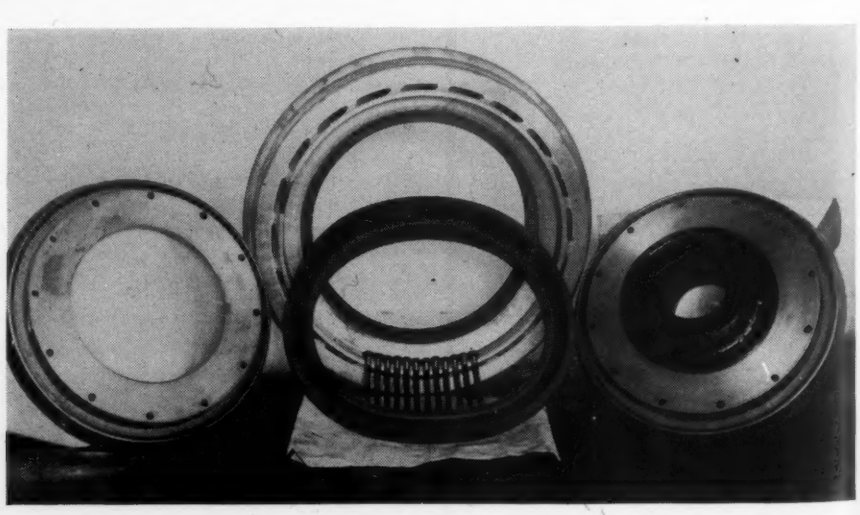


Fig. 2—Disassembled parts of new type wheel. Center rear, cast steel tire; left and right, steel retainer castings; center, rubber insulators. In assembling, rubber insulators are inserted one on each side of tire, with hub casting on one side and retainer casting opposite, bolted in place.

*Metallurgist, Minneapolis Steel Castings Co.

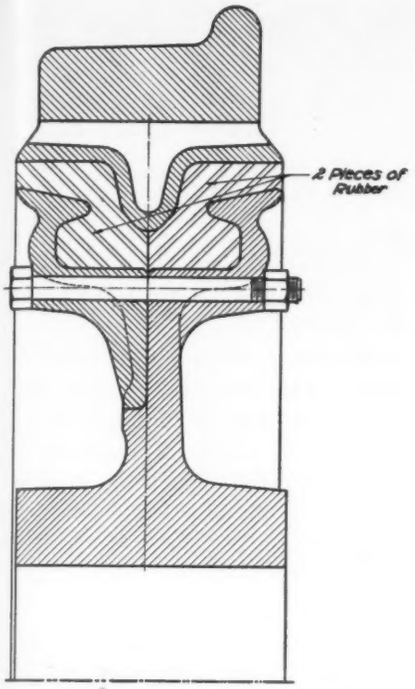


Fig. 3—Cross-section through wheel, showing rubber insulators precompressed when the wheel is bolted together.

the surface in contact with the rubber is cut down about 78 per cent by these cooling slots. Besides cutting down the continuty of the metal, the slots are set at an angle of 45 degrees with the side of the tire. This creates a forced draft through the slots when the wheel is in motion. The discontinuity of the wheel and the air cooling at these slots reduce the temperature of the tire where it comes in contact with the rubber, so that no deterioration of the rubber takes place.

Tires without these cooling slots could be rolled, but the success of these wheels depends on the ability to keep the rubber from deteriorating. This was one of the reasons for going to a steel casting.

Castings Specifications

The analysis and physical properties specified for the material in the casting are the same as that specified by the railroads for rolled tires on freight locomotives. This specification requires the following:

Analysis

	Per Cent
Carbon	0.60-0.75
Manganese	0.50-0.75
Silicon	0.15-0.35
Phosphorus	0.05 max.
Sulphur	0.05 max.

Table 1

Analysis and Physical Properties of Typical Heats

Analysis

	Heat No. 1462	*Heat No. 1466*
Carbon, per cent	0.63	0.64
Manganese, per cent	0.96	0.91
Silicon, per cent	0.95	0.75
Phosphorus, per cent	0.031	0.028
Sulphur, per cent	0.043	0.038

Physical Properties

	Heat No. 1462	*Heat No. 1466*
Tensile Strength, lbs. per sq. in.	127,450	126,400
Elongation, per cent in 2 in.	13.4	11.8
Reduction of Area, per cent	18.8	15.9
Brinell Hardness No.	241.	241.

Physical Properties

Tensile strength, lbs. per sq. in.	115,000
Elongation, per cent in 2"	10.0
Reduction of area, per cent	14.0

The analysis and physical properties of two typical heats are as shown in Table 1.

It will be noted that the manganese is slightly higher and the silicon is very much higher than the specification requirements. This was done to promote absolute soundness and apparently was a sound conclusion, as the tires have worn very uniformly. Due to the higher manganese and silicon contents, the tensile strength is considerably above the minimum requirements and this is with a full anneal heat treatment. The ductility also ran well above that required by the specification.

Advantages of New Tire

Although it is too early to say definitely what ultimate success this wheel will have, it has already developed certain advantages over a wheel with a rigidly mounted tire. Due to the resilience of the rubber, the locomotive gets better traction for its weight than when the tire is rigidly mounted. A locomotive gets the greatest traction just before the tire starts slipping on the rail. The rubber apparently has enough "give" to it to obtain a more even distribution of the tractive force to each wheel, and in this way increases the traction of the whole unit.

One other advantage that is particularly appealing to the railroads is the ease with which this tire may be changed as compared with the difficulty of changing a rigidly mounted tire. When it becomes necessary to change one of these rubber insulated tires, it may be done right in the field.

The truck on which the tire is to be changed is jacked up and the twelve bolts holding the two retainer castings are removed. The retainer casting (which is separate from the hub) is then

Fig. 4—Type of 44-ton Diesel locomotive on which new type wheels have been used successfully, resulting in plans to produce wheels capable of still heavier loads.

removed, the rubber insulator slipped out and the tire comes off. The new tire can then be slipped on and the wheel reassembled.

With a rigid tire, the locomotive must be sent to the shop where it can be blocked up and the truck removed to a press, where the wheel is first removed and then the tire. It is then necessary to shrink a new tire on the wheel and reassemble the truck and replace it on the locomotive. This is an expensive job in the first place and also ties up the unit for several days, as compared with a few hours for the cast tire with its rubber insulators.

A locomotive using these wheels is shown in Fig. 4. This is a 44-ton locomotive. Due to the success of these small locomotives, plans are being made to produce wheels capable of carrying heavier loads.

The steel castings industry, through its ability to produce intricate designs successfully, has made possible this radically new design in wheel construction.

Receive Entries for A.F.A. Essay Contest

FOLLOWING announcement of a new Student Essay Contest for engineering school undergraduates in the October issue of *American Foundryman*, several entries have already been received by A.F.A. headquarters. The contest, known as the A.F.A.—S. Obermayer Student Essay Competition, is sponsored by the A.F.A. Committee on Cooperation with Engineering Schools, of which Fred G. Sefing, International Nickel Co., New York, is chairman.

Any undergraduate student in an accredited engineering school is eligible to enter the competition, in which a first prize of $100 and second prize of $50 will be awarded when the contest closes March 10, 1943. Entries will be judged by a jury composed of prominent men of the foundry industry, emphasis being placed by the jury of awards on the importance of the subject to the industry, clearness of presentation, and accuracy of information submitted.

All entries should be submitted to the Secretary of A.F.A., 222 West Adams St., Chicago, Ill., from whom detailed information on all aspects of the contest can be obtained.

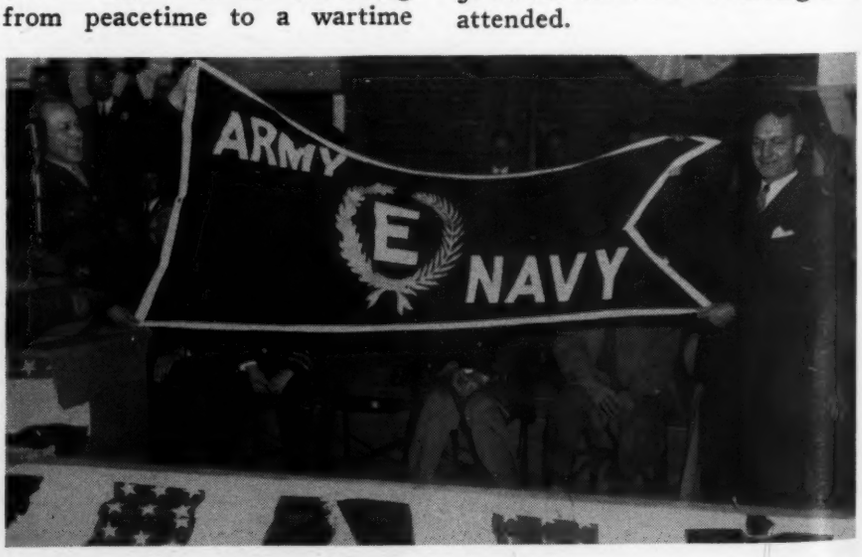
"E" Flag Awarded Continental Roll's East Chicago Division

ANOTHER important foundry was recognized for outstanding work on the production front when the Army-Navy "E" pennant was presented October 14 to the East Chicago division of the Continental Roll & Steel Foundry Co. This was the second production award for Continental, the Navy "E" being presented to the Wheeling division in May.

Colorful presentation ceremonies were held in the company's No. 3 foundry at East Chicago, Ind., with over 5,000 workers, their families and visitors attending. The "E" pennant was received by H. A. Forsberg, general superintendent of the division, for the company, presentation being made by Brig. General J. K. Christmas, representing the War Department. Silver insignia were also presented by Lt. Commander W. P. Kellogg, U.S.N., to four employees, George Bulkley, Charles Rosenberg, P. J. Johnson and H. Carlson, for the workers.

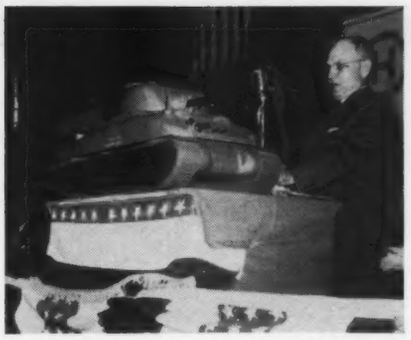
In his presentation address, Gen. Christmas praised the firm for its fine work in converting from peacetime to a wartime basis, and stressed even greater production efforts. "While we come here to reward you for your excellent work," he said, "we must also call on you to continue that work, to exceed all your past records. It is steel and steel alone which now determines our rate of production of war materials."

Commander Kellogg, and J. T. Osler, chairman of the board and president of Continental, delivered short talks as well as Mr. Forsberg. Guests on the speakers platform included Brig. Gen. T. S. Hammond, chief of Chicago Ordnance district, formerly president of Whiting Corporation, Harvey, Ill.; Lt. Col. J. Slezak; Maj. L. J. Brunton; Capt. F. W. Renwick, Jr.; Capt. S. C. Massari; Lt. R. J. Dombrow, Lt. George E. Rose, Jr.; Lt. L. Putze; Lt. W. D. Raddatz, all of the U.S. Army; Capt. S. C. Loomis (Ret), Lt. Comm. T. M. Brantigam, and Lt. Comm. L. Berry, all of the Navy; Mayors Frank Migas of East Chicago, E. L. Schaible of Gary, G. B. Smith of Hammond, and J. T. McNamara of Whiting also attended.



Brig. Gen. John K. Christmas (left) presenting the coveted Army-Navy "E" award to H. A. Forsberg, superintendent, East Chicago division of Continental Roll & Steel Foundry Co., for an outstanding production job by that firm.

H. A. Forsberg, superintendent, Continental Roll & Steel Foundry Co., East Chicago division, speaking at the October 14 "rally" when his company received the famed "E" production flag.



Among the speakers at the colorful October 14 ceremonies, at Continental Roll's East Chicago division, when the Army and Navy honored the company, was Jay T. Osler, chairman of the board and president of the firm.

A.S.T.M Standard Carbon-Steel Specifications A215-41 Abstracted

THESE specifications cover Carbon-Steel Castings to be used for miscellaneous industrial purposes of quality suitable for fusion welding, either by a field welding process or in the construction of weldments made up of cast steel or combination of cast steel and wrought steel members, and as distinguished from carbon-steel castings made for high-temperature service.

The grades covered by these specifications represent materials that are recognized as readily weldable by procedure as established under the accepted welding rules of such bodies as the A.S.M.E. Boiler Code Committee and the American Welding Society. However, these limitations do not imply that material of composition differing from those specified is not weldable with the use of proper technique.

The term "weldable," as related to steel castings, does not imply that no special precautions need be taken in welding any or all shapes of steel castings. Regardless of composition, the welding of any steel casting or other steel part of intricate shape or of greatly varying cross-sections, may necessitate special welding technique not generally considered necessary for the welding of parts of reasonable symmetrical form.

Five Grades Covered

Five grades of cast steel are covered, as indicated below, the grade desired to be specified by the purchaser:

Grade N-1-W not required to be physically tested, nor to be heat treated except in cases where defects will not impair the strength of the castings, are repaired by welding by an approved process. In such cases, after welding, the castings shall be heat-treated if required by the purchaser's inspector.

Grade N-2-W not required to be physically tested, but required to be full annealed, normalized or normalized and drawn.

Grade A 1-W required to be physically tested, but not required to be heat-treated except as under the same conditions as described under Grade N-1-W.

Grade A-2-W required to be full annealed, normalized or normalized and drawn and to be physically tested.

Grade B-W required to be full annealed, normalized or normalized and drawn, and to be physically tested.

The steel shall be made by one or more of the following processes: Open-hearth, electric-furnace, converter, or crucible.

Heat Treatment

A heat treatment either by full annealing, normalizing or normalizing and drawing, at the option of the manufacture, shall be applied to all castings of grades N-2-W, A-2-W, and B-W. Castings of welding quality shall not be cooled from above the critical range by liquid quenching, liquid spraying, or air blasting. Unless otherwise specified, all castings may be annealed one or more times and may be given a supplementary heat treatment by tempering or drawing.

Chemical Composition

The steel shall conform to the requirements as to chemical composition prescribed in Table 1.

Tensile Properties

Steel used for the castings shall conform to the requirements as to tensile properties prescribed in Table 2.

Table 1

Chemical Requirements

	Carbon max., per cent*	*Manganese, max.,* per cent*	*Phosphorus, max., per cent*	*Sulfur, max., per cent*	*Silicon, max., per cent*	*Manganese max., per cent*
Grade N-1-W	0.25	0.75	0.05	0.06	0.60	1.10
Grade N-2-W	0.35	0.60	0.05	0.06	0.60	1.00
Grade A-1-W	0.25	0.75	0.05	0.06	0.60	1.10
Grade A-2-W	0.30	0.60	0.05	0.06	0.60	1.10
Grade B-W	0.35	0.60	0.05	0.06	0.60	1.00

*For each reduction of 0.01 per cent below the maximum specified carbon content, an increase of 0.04 per cent manganese above the specified maximum will be permitted up to a maximum as shown.

Table 2

Tensile Requirements

	Tensile Strength, min., lbs. per sq. in.	*Yield Point, min., lbs. per sq. in.*	*Elongation in 2 in., min., per cent*	*Reduction of Area, min., per cent*
Grade A-1-W, Unannealed	60,000	30,000	22	30
Grade A-2-W, Normalized[a]	60,000	30,000	24	35
Grade B-W, Normalized[a]	65,000	35,000	20	30

[a]For each reduction of 0.01 per cent below the maximum specified carbon content, an increase of 0.04 per cent manganese above the specified maximum will be permitted up to a maximum as shown.

Metal Penetration in the Mold

By E. E. Woodliff,* Detroit, Mich.

The subject of the following article is frequently associated with cleaning room problems and loosely attributed to "penetration." Two common types of penetration are discussed, both remediable through better sand control. When the defect occurs as a rough finish on the casting, better flowability and more uniform bonding will help the condition. A second type of defect is true penetration of metal into the sand and may be alleviated by (a) adding silica flour to the sand mix, or (b) using a sand having wider grain distribution.

FOUNDRYMEN experiencing castings defects which make their castings difficult to clean have, in the aggregate, termed this metal penetration. There is no casting defect term more loosely used than this term "penetration." It is the author's intent in this article to clarify what is believed to be the two common types of penetration of metal into the sand mold.

Since metal is poured into sand molds having a wide degree of mold hardness, and the metal is of varying fluidity values, one would be inclined at first analysis to believe that a soft rammed mold and high fluidity would be the cause of hard and difficult cleaning of the casting. As a matter of experience, the author does not put much stock in this analogy.

Two Types of Defect

Before dealing with the possible conditions which promote penetration, we must first analyze the defects. To the author's knowledge, there are at least two distinct types of the defect. The first, and by far the most common, penetration of metal into the mold shows up as a rough "sand paper" finish on the casting, usually associated with extreme roughness along vertical pattern surfaces.

The second type of metal penetration into the mold, while not as common as the first, is by far the most troublesome to the finishing department. This type of metal penetration is truly a penetration of metal into the sand. Instances have been noted where the metal has penetrated to a depth of over one inch into the sand. This type of penetration is almost always associated with castings having a rather heavy metal section.

*President, Foundry Sand Service Engineering Co.

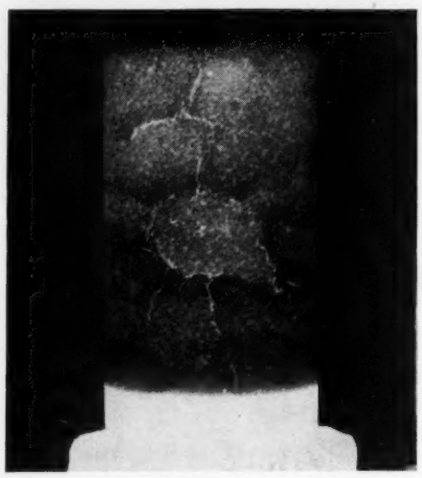


Fig. 1—Sand sample heated in dilatometer furnace, showing early expansion strains and subject to metal penetration.

This imbedded metal in the sand must be chipped from the casting, and by the nature of its formation is usually very difficult to get at with the chipper's chisel. Several foundrymen, out of curiosity, have had a chemical analysis made of this conglomerate mass and have reported upwards of 50 per cent metal.

Before considering this second type of metal penetration in much detail, it seems best to go back and discuss the first type since this is by far a more common defect.

Dealing with Rough Surfaces

Metal penetration, or rough casting surface, in some foundries is looked upon as such a common defect that there are more grinders in the finishing department than molders in the foundry. This type of casting surface can be improved by lowering of the sand's permeability, but this is by no means a positive cure. While the general appearance of a casting surface can be improved by the use of a sand of uniform grain size, this method of attack will not always stop the penetration of the first type —that is, unless other considerations are given to the factors influencing the sand's flowability.

Sand investigators have known for a long time that the property of sand flowability has played a very important part in the casting finish. This property of flowability is not as readily controlled as some others in a molding sand. To improve this value, a major change in the sand usually is necessary.

Finer Sand Suggested

Investigations have shown that in order to improve a sand's flowability a finer sand must be selected, since the flowability of a fine sand is usually higher than a coarse grain sand. This change in base sand need not cause a lowering of permeability, as a fine sand can be chosen which has a uniform grain structure giving high venting qualities.

The second factor in the production of a better flowing sand to consider is the sand's toughness. This property is largely influenced by the amount of bonding agent present and its distribution through the sand mixture.

A sand which is properly blended with the bond being uniformly mixed through it, and having a fineness recommended for the type and weight of casting, will do much to eliminate surface penetration of the metal into the mold. Consideration of these few simple rules in molding sand selection and preparation should be justified by the reduced hours which a casting takes to pass through the cleaning room.

Second Type More Complex

The second type metal penetration, described briefly earlier in this article, is more complex in its formation. Since this type of penetration is usually associated with castings weighing in excess of 1,000 lbs., or the ex-

tremely chunky type of casting, special consideration must be given to the structure of the base sand.

A casting in this class of work will put, by nature of its weight, a large quantity of heat units into the sand mold. This quantity of heat is sufficient in most molds to cause the temperature of the sand to reach the molten metal temperature, a condition which is not present in castings of thinner section or lighter weight. A sand suitable for castings of the large class of work, therefore, must have rather closely controlled high temperature properties.

Results of Tests

From the author's investigations made on a molding sand prone to give penetration of the second type, a few simple observations have been made.

In every case the sand was a blended sand, having a base sand with rather a narrow grain spread—that is, at least 70 per cent on three adjacent sieves. While records on this type of sand do not necessarily show that it has a higher expansion than a sand having the same average grain, but a wider distribution of grain, the records do indicate that this sand will expand more at lower temperatures. This is due no doubt to the greater heat conductivity through the sand's void space.

This same sand, when immersed in a furnace temperature of 2500 deg. Fahr., showed surface cracks on the specimen after only 30 seconds' heating. Continued heating of the specimen showed these surface cracks to appear largest after 4 minutes' continued heating, at which time the temperature of the specimen had reached a bright heat estimated to be between 1600 to 1800 deg. Fahr., this being about the temperature at which most sands have their greatest expansion value. Continued heating of the sand showed a reduction in size and number of these surface checks taking place as the sand contracted under higher temperatures.

Making use of these few observations, two methods offer themselves to the solution of the problem. The first, which many steel foundrymen have applied, is to stop metal penetration by the addition of silica flour to the sand mixture. In order to overcome this metal penetration. usually 10 to 40 per cent silica flour is required, depending upon the coarseness of the base sand. A sand containing such a high percentage of silica flour tends to become brick-like in the mold, and does not collapse readily, so it would seem that the use of silica flour has limitations.

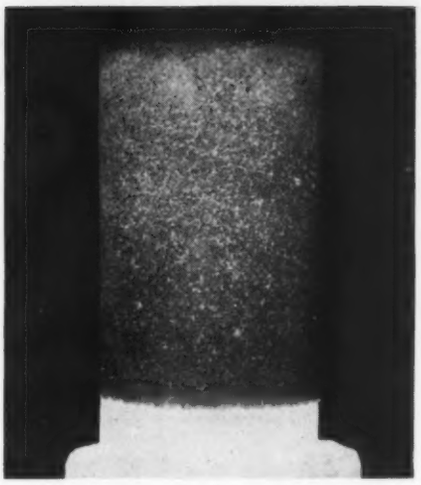


Fig. 2—Sand specimen heated in dilatometer furnace, showing no strains, due to controlled early expansion.

The second approach to the problem of mold wall cracking, and subsequently penetration, is to apply the use of a wide grain distribution sand. (See Table 1.) This application of gravel is justifiable in many foundries. They make use of a gravel sand blended with the molding sand for the production of castings such as machine tools. A base sand containing upward of 50 per cent coarse grain, 20 to 70 mesh, has extremely good collapsibility and, if rammed uniformly hard, well bonded and dried, makes a satisfactory base molding sand for heavy casting production.

Table I

Sieve Breakdown of Two Sands

Sieve No.	—Per Cent Retained— Sand A	Sand B
6	1.0	2.5
12	0.6	5.5
20	0.6	15.4
30	0.2	8.5
40	3.2	7.9
50	14.7	10.4
70	32.8	18.1
100	27.4	14.7
140	9.0	4.8
200	2.2	1.4
270	0.8	0.5
Pan	0.6	0.8
A.F.A. clay	6.9	9.4

NOTE: Sand A showed early expansion surface check upon sudden heating, while Sand B did not.

Committee Meets for Cupola Research Work

THE Steering Committee of the Cupola Research Project Committee met during the recent convention of the American Society for Metals in Cleveland. At this meeting, the material collected for the extensive manual on cupola operation, which the committee has under way, was reviewed. Some 80 members, divided into seven subcommittees, have prepared and submitted material for inclusion in the manual. That material now is being reviewed and edited in preparation for publication.

High Temperature Sand Group Meets

THE subcommittee of the Foundry Sand Research Committee on Physical Properties of Steel Foundry Sands at Elevated Temperatures, of which D. L. Parker, General Electric Co., Everett, Mass., is chairman, held a meeting October 14 in Cleveland. The subcommittee reviewed thoroughly the program of basic and practical research under its jurisdiction. It suggested several additions to the subcommittee and discussed formation of a sub-subcommittee to study the effect of high temperatures on cores. It also authorized appointment of a subcommittee to study and recommend procedures for the determination of high temperature properties on steel, gray iron, malleable, brass and bronze, and aluminum and magnesium sands.

An important point of discussion was the difficulty of securing personnel to conduct the research. J. R. Young, A.F.A. Fellow at Cornell University, Ithaca, N. Y., who has been doing the work, has been requisitioned for teaching war personnel courses

at the university and will no longer be available. For the university to continue the work, some new person must be obtained. In addition to salary paid the Fellow by the Association, the individual has the opportunity of working for an advanced degree at Cornell.

The subcommittee also appointed C. W. Briggs, Steel Founders' Society of America, Cleveland, to approach the U. S. Naval Research Laboratory to assist in the program because of the ability of the laboratory to carry forward the work in an uninterrupted manner.

Time-Motion Study Article Copyrighted

IN PUBLISHING an interesting article on "Time and Motion Study by Foremen," by Phil Carroll, Jr., management consultant, Maplewood, N. J., in the October issue of *American Foundryman,* mention was inadvertently omitted that the article is copyrighted by the author and was reprinted by his permission. Mr. Carroll, also the author of "Time Study for Cost Control," first presented the material in the article before the Executives' Club, Orange and Bloomfield, N. J., at a meeting earlier this year.

What Are You Doing to Aid the Scrap Drive?

SPEAKING about the necessity of bringing forth more scrap of all kinds for America's war production, Donald M. Nelson, Chief of W.P.B., has made the following plain, bald statement:

"We are faced with a serious shortage of steel scrap, rubber and other vital materials. That shortage must be filled."

In order to produce sufficient scrap the American Industries Salvage Committee, New York, has been organized and is coordinating its efforts with the Conservation Division of W.P.B., with a nation-wide advertising and publicity campaign. The Industrial Salvage section of the Conservation Division is requesting executives of national and local industries in 435 industrial centers to "house clean" every plant in their area. Salvage Managers have been appointed in many cases within individual plants with the responsibility and authority to scrap whatever is *not in actual use,* and to have it shipped immediately to war plants.

When Is "Scrap?"

In seeking to do its share in this tremendous job, probably every plant management has asked itself this question: "Just how far should we go in scrapping materials or equipment in our plant?" The answer, of course, lies largely with individual judgment, but it may be helpful to note that the National Association of Manufacturers, in a film on the scrap problem developed in co-operation with W.P.B., used the following keynote:

"If it has not been used for three months, and if it will not be used in the next three months, Scrap It!"

That should be a pretty good guide for just about any plant, including foundries. The heads of many organizations have passed down definite orders that "anything not having an immediate use should be scrapped immediately."

What Is Scrap?

Since the scrap drive was first begun, a great quantity of material has been siphoned off from plants, homes, garages, farms, cellars, attics, and all manner of hidden corners. Now it has become necessary to examine more thoroughly both the inside and outside of each plant to determine if there are not more materials that can be fed to the furnaces producing vital war production materials.

To this end A.F.A. offers a list of possible sources which may or may not have already been exhausted, and suggests the delegation of some one person in each foundry plant to investigate each source thoroughly. No doubt many of the materials listed below will bring to mind other sources omitted from the list.

A Few Scrap Sources

Hardware—door knobs, hinges, keys, locks, trim springs.
Ornaments—metal ash trays, old lighting fixtures, etc.
Screening—brass, copper or iron wire.
Old coal stoves.
Fire extinguishers.
Furnace parts—old grates, doors, tools.
Pipe—unused pieces of iron, brass or copper piping.
Radiators and covers.
Plumbing fixtures—bath tubs, faucets, sinks, boilers.
All old tools of any kind.
Water heaters and tanks.
Automobile parts—batteries, chains, old license plates, parts of motors, tires, tubes, crank handles, old or extra tools.
Wire fencing, fence posts, iron fencing, flag poles.
Old buckets and wash pails.
Tin roofing.
Metal signs and ornamental work.
Gears and flywheels.
Oil drums, kerosene cans, etc.
Metal shavings.
Broken carborundum wheels.
Cables, line shafting, old chains.
Obsolete or broken dies.
Rejected pieces.
Metal filings and grindings.
Bolts and rivets, rusty or odd size.
Electric wiring, transformers, coils.
Instruments and gauges no longer used.
Broken saw blades.
Old wrenches, pliers, soldering irons.
Discarded castings, machine tools and parts.
Pipes and valves, plumbing.
Motors, steam engines.
Conveyor belts, pulleys, hangers.
Worn shovels, steam shovel buckets.
Transmission belts, chains and hooks.
Wire rope.
Rusted machinery.

Once these sources have been exhausted of their possibilities, what then? For one thing, each foundry operator should ask himself if that odd lot of castings undelivered, unused, canceled, or frozen for duration is of more use in his plant "in case" than it would be in the war

scrap pile where its usefulness will be immediately certain.

Hidden Scrap Sources

Assuming that every foundry has already contributed something to the scrap drive, over and above the usual sources inherent in every process of manufacture, there still are a number of sources the average foundry could tap. In many cases a good old-fashioned house cleaning will not only turn up a lot of scrap but also will improve shop conditions.

How about the top of core ovens and furnaces . . . favorite places to toss something out of the way. How about that pile of old wooden flasks out in the yard . . . isn't there a lot of metal still in them that could be salvaged for scrap? Have you thoroughly checked over your store and stock rooms, especially those dust-covered out-of-the-way corners and top shelves?

Even in the office, scrap can be turned up. For example, one large firm recently cleaned out its engineering department and found several hundred pounds of stainless steel, enameled ware, aluminum, copper sheet and other materials . . . all samples submitted over a period of years by salesmen from many concerns. Almost every company has such samples tucked away somewhere.

A Great Opportunity

In this scrap drive the foundry industry, and every industry, has the opportunity of a lifetime to do a thorough job not only of shop house cleaning, but also, and perhaps even more important, of *account* house cleaning. The present emergency offers a splendid chance to eliminate from the books any and all items for which there is no immediate use, or possible use in the near future. Obsolete machinery, equipment and parts; dead stocks of manufactured goods; many repair parts and completed units for which there is likely to be no sale "for duration" . . . here are scrap sources that many firms undoubtedly have not yet approached.

It should be remembered that many such items, depending on a firm's capital structure and its accounting methods, can now be wiped off the books with the possibility of their salvage representing legitimate charges against the profit and loss account. No foundry should overlook this possibility, and should consult its regular certified public accountant on the matter before assuming that it has exhausted all scrap sources.

Drive Must Not Lag

Our war effort must not be allowed to bog down because of shortages of critical materials. There is no such thing as "too much" scrap. It is not only a patriotic duty, but just plain common sense, that every foundry executive should take immediate and thorough steps to examine *every* department of the entire plant for salvageable materials. Metal is the lifeblood of the foundry: Don't waste it, and don't let a pound of it lie idle!

Plans Further Study of Graphite Classes

THE Gray Iron Division Committee on Classification of Graphite in Gray Iron, which is working in cooperation with A.S.T.M. Committee A-3, Subcommittee VII on Microstructure of Cast Iron, held a meeting in Cleveland October 13. Chairman W. E. Mahin, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., called the meeting to discuss further activity of the A.F.A. committee on this subject.

Through the joint efforts of the A.F.A. and A.S.T.M. subcommittee, a chart showing a recommended size and type classification for graphite in cast iron, together with suggested methods for selection and preparation of specimens, was published recently. This chart should be in all laboratories dealing with gray iron structures and should be used as a basis for description in articles and papers referring to size and shape of graphite formations. The chart is available through the offices of the American Foundrymen's Association, 222 West Adams Street, Chicago.

Personnel of the A.F.A. committee supervising this project was published in the October, 1942, issue of *American Foundryman.*

1st Meeting of Core Test Subcommittee

A NEW subcommittee of the Foundry Sand Research Committee, the Core Test Subcommittee, with E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland, as chairman, recently was formed by your Association and held its first meeting October 13 in Cleveland. The function of this subcommittee will be to formulate tests for the determination of various properties of core sands and cores, to specify procedures for such tests, and to state the requirements that any apparatus which may be designed to conduct such tests shall meet. For the present, the subcommittee will deal with room-temperature tests only.

The new subcommittee was formed on demand of the membership of the Association because of increased interest in the behavior and properties of cores. The membership of the subcommittee is as follows:

E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland, *Chairman;* B. M. Weston, Aristo Corp., Detroit, *Vice-Chairman;* Emile Pragoff, Jr., Hercules Powder Co., Wilmington, Del., *Secretary;* Samuel Appleby, Buffalo Foundry & Machine Co., Buffalo, N. Y.; Wm. Buckholtz, Belle City Malleable Iron Co., Racine, Wis.; H. J. Cole, General Electric Co., Schenectady, N. Y.; E. R. Crosby, Smith Facing & Supply Co., Cleveland; H. W. Dietert, Harry W. Dietert Co., Detroit; H. E. Donnocker, Ottawa Silica Co., Ottawa, Ill.; M. E. Gantz, American Magnesium Corp., Cleveland; H. K. Salzberg, Casein Co. of America, Bainbridge, N. Y.; F. J. Sedlak, Ohio Brass Co., Mansfield, Ohio; R. D. Walter, Werner G. Smith Co., Cleveland; E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit.

At the Cleveland meeting, the

subcommittee was organized and reviewed carefully the present testing methods contained in "Testing and Grading Foundry Sands and Clays," and is recommending many changes. In addition to those tests mentioned in the above publication, the subcommittee discussed the advisability of beginning the study of tests designed to give data on other core properties. Several sub-subcommittees were appointed to study particular tests and to report their recommendations at a future date.

Caterpillar Sponsors Company of Engineers

FIRST of the equipment manufacturers to respond to the call of the U. S. Engineers Corps for an organization of skilled men to "keep 'em rolling," Caterpillar Tractor Co., Peoria, Ill., announces that it has sponsored a Corps of Engineers Heavy Shop Company. The company, consisting of 199 officers and men, most of whom will become non-commissioned officers or technicians, is composed chiefly of skilled men from the Caterpillar plant and is now in training for active service.

Capt. Jean Walker, formerly export representative for the Peoria firm, is in command of the new company. All of the men are volunteers and left Peoria recently in a body following appropriate farewell ceremonies which several thousand Peoria residents attended. Among the speakers at the ceremonies were L. B. Neumiller, president of Caterpillar Tractor Co., and Col. M. M. Dawson, chief of requirements, Storage and Issue branch of the Supply division, U. S. Corps of Engineers, Washington, D. C.

Adequate nutrition of workers under war production conditions is covered by a 28-page booklet entitled "Lunchrooms for Employees," issued by the Policyholders Service Bureau, Metropolitan Life Insurance Co., New York, offering a detailed study with practical data on equipment, management and menus.

Advisory Committee on Brass-Bronze Meets

THE Advisory Committee of the Brass and Bronze Division of your Association, which represents the interests of that branch of the non-ferrous foundry industry, held a meeting October 14 in Cleveland with Chairman Wm. Romanoff, H. Kramer & Co., Chicago, presiding. Announcement was made of the fact that the former Non-Ferrous Division of A.F.A. had been divided into two sections, each with a division status, and that one division represents the brass and bronze interests, and the other division represents aluminum and magnesium.

Considerable time was used in discussing the program of papers for the 1943 convention. Attempts will be made to secure papers on the casting of test bars for various copper-base alloys and possibly to discuss various recommended practices now in preparation for the production of castings from several classes of copper-base alloys. It also was suggested that information on the proper use of temperature control equipment in the pouring operation be discussed at the round-table conference.

Other subjects included plans for the round-table conference, the publication of a proposed Recommended Practices Book covering both copper-base alloys and light metals, and activities of the Brass and Bronze Division Handbook Revision Committee. A very interesting discussion was also held on the function of the Research Committee and a program of activities was outlined which, it is hoped, will result in extensive activity in the future.

New Jersey Foundry Receives "E" Award

WORD has been received that the Leslie Co., Lyndhurst, N. J., who operate a nonferrous foundry, has been awarded the joint Army-Navy "E" for excellence in war production. Thus another A.F.A. member is added to the long list of those who have received the country's outstanding production honor, the Leslie Co. holding a Company Membership in the Association in the name of E. M. Hopper, engineer.

In making the announcement to A.F.A., S. Inglis Leslie, president, stated: "We do not believe that this tribute could have been won had it not been for the very fine service and assistance of many companies like yours in supplying us with the necessary materials, manufactured goods or services."

Residents of Peoria, Ill., and employees of the Caterpillar Tractor Co. of that city bid farewell to officers and men of the volunteer Heavy Shop Company of the U. S. Engineers, sponsored by the Caterpillar firm and composed chiefly of skilled men from that plant. The new unit is now in training for active service with the Engineers.

ArmaSteel---Cast for a Leading Role in Industry Its Manufacture, Control and Application---III

By Carl F. Joseph,* Saginaw, Mich.

This is the final section of the Official Exchange paper of the American Foundrymen's Association to the Institute of British Foundrymen and discusses inspection control of the castings made by the processes outlined by the author in the previous sections and the uses of the castings. The first two sections of the paper appeared in the September and October issues of this magazine.

As mentioned in a previous section of this paper, the foundry industry has learned a great deal from the steel forging industry, both in the practical as well as the technical side of the business. The production of ArmaSteel requires much closer control and inspection than ordinarily given in the foundry industry, but due to the nature of the parts which this material is replacing, all available tests to satisfy us that the part is sound and free from defects are made. Castings are dissected, polished and coarse etched in a hot acid bath to bring out any unsound areas, cracks, slag or any other hidden defects. This is a daily routine on many castings. Figure 13 (left) shows this set-up.

Magnaflux operations are performed on certain castings, which, due to design, are prone to crack. Figure 13 (right) shows this operation on automotive ArmaSteel pistons. Electric resistance testing for cracks is conducted on all camshafts. Figure 14 (left) shows this operation on automotive ArmaSteel camshafts.

*Research Metallurgist, Saginaw Malleable Iron Div., General Motors Corp.

Liquid pressure testing at 1500 p.s.i. on truck and railroad diesel pistons is carried out 100 per cent to guarantee soundness and absence of leakers.

Many ArmaSteel parts are Brinelled 100 per cent, where the hardness limits are a controlling factor in the successful operation of the part.

Figure 14 (right) shows a set-up whereby automotive rocker arms are ground, Brinelled and inspected 100 per cent. These tests illustrate the extent to which inspection control is carried out to insure satisfactory ArmaSteel parts.

Viewpoint of Graphitic Steel

The foundryman producing graphitic steel castings must take a long range view of his possibilities of continuing to produce this metal. A few years ago, such promotion usually meant competition with ferrous and non-ferrous castings, forgings, weld fabricated structures, etc. Today, producers of those materials have plenty to do to get out production and less time to look into competitive markets.

Piston Replacement

Take the automotive piston for instance. Prior to curtailment, and, finally, stoppage of automobile production, ArmaSteel pistons replaced some aluminum pistons.

Aluminum alloys machine more readily, have better heat conductivity and have less weight of moving parts. These offset the undesirable expansion characteristics of the metal, which are compensated for by design, and the higher cost of the metal per pound. Today it appears that pistons will have to be made from some other material, and of all materials available, graphitic steel, without a doubt, offers the best replacement. At present, automotive and diesel engines are successfully operating with pistons made from this material.

In an emergency, many prejudices and preferences must be thrown overboard. Let it be assumed for the moment that the present emergency may bring about considerably more widespread use of graphitic steel as a replacement. It would be shortsightedness, indeed, to accept

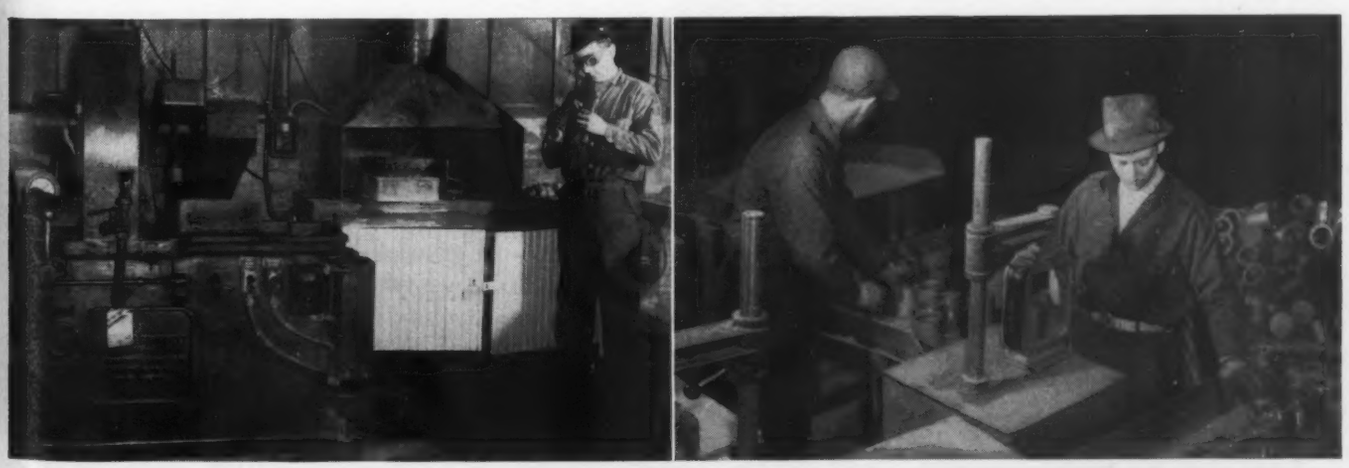


Fig. 13—Left) Set-up for cutting and coarse etching castings to casting defects. (Right) Arrangement of Magnaflux Testing Equipment.

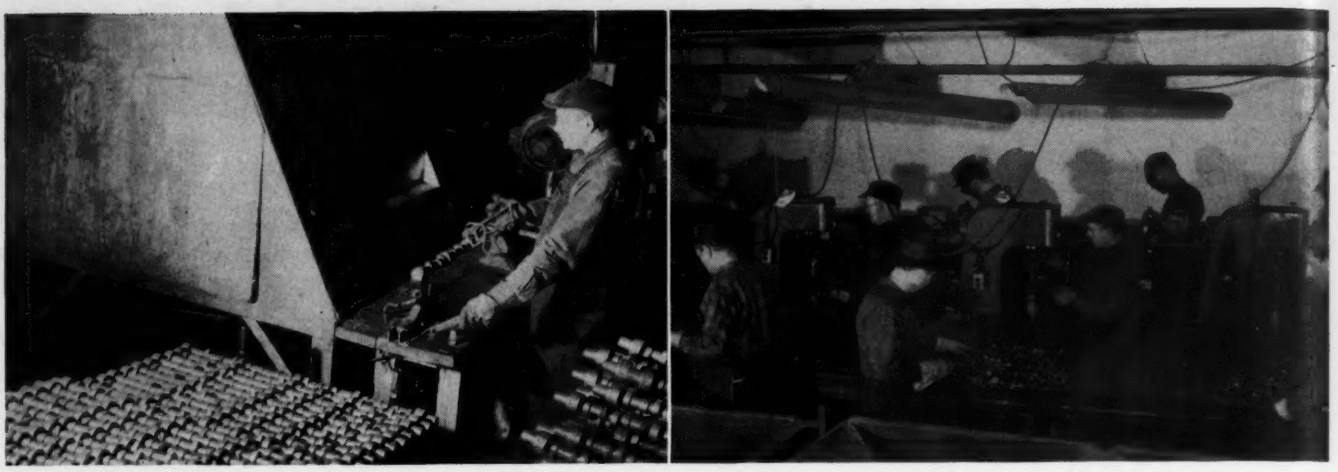


Fig. 14—(Left) Electric resistance testing of crankshafts to determine the presence or absence of cracks. (Right) Set-up for grinding, Brinelling and inspecting automotive rocker arms. This is a 100 per cent operation.

such changes as an act of Providence and let it go at that. Unless foundrymen are alert to the possibilities, more ultimate harm than good may come from such replacements. Many applications have been brought to the attention of the foundryman, not because the manufacturer was willing to use another material, but because he found it necessary to do so in order to continue in operation. The old proverb "Necessity is the mother of invention" has been found to hold true in the expanding use of ArmaSteel.

The gage of any return to such parts as aluminum alloy pistons will be its engineering performance vs. graphitic steel, availability of the metal, and its ultimate cost. The current enormous expansion of the aluminum industry suggests that before long there will be so much aluminum available that it may go begging, and at a price per unit of volume that will give present replacements some close competition. The past year has seen a 25 per cent reduction in the market price of ingot aluminum, and further reductions without a doubt are a possibility. This means that it will be necessary for the malleable foundryman to be just one jump ahead of his competitor and continue to produce a superior product which will keep him in the lead at all times.

Desirable Properties

ArmaSteel has many desirable properties which make it outstanding in the ferrous field. In general, the machinability is from 10 to 30 per cent better than steel forgings at the same Brinell hardness. The excellent damping characteristics are exhibited in the many parts, such as the camshaft. It has a high yield ratio, especially when a Brinell hardness of 200 or over is desired. Many installations have eliminated the bronze bushing, and the excellent non-seizing properties in metal to metal wear are recognized. This is illustrated in the elimination of the bronze bushing in the automotive rocker arm, operating on a hardened shaft. Crankshaft tests have proven the high fatigue life of ArmaSteel. One of its most valuable properties is that the metal responds readily to localized hardening. Camshaft flame hardening machine is shown in Fig. 15 (Left).

The response of this material to localized hardening is used in flame hardening and induction hardening of the cams on camshafts, shifter yokes and gears; also, the dipping or rocker arm pads in molten lead, followed by quenching. This surface hardness produces maximum wear resistance. High hardenability rating is a valuable property when this material is used to produce important gear parts. It has been found comparable to 5040-A steel, using the Jominy hardenability test bar. Figure 15 (Right) shows comparison of hardness-cooling rate curves of ArmaSteel and forging steels. Figure 16 shows typical physical properties of ArmaSteel.

Hardness-Cooling Rate Curves

Hardness-cooling rate curves show how the hardenability of ArmaSteel compares with other commonly used steels. By means of these curves, it is possible to predict what hardness can be obtained by that treatment of different sized sections.

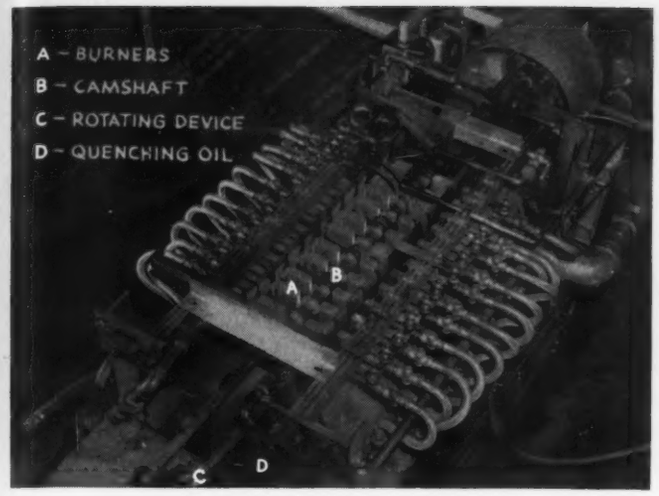
Knowledge of hardenability of different steels has made it possible to select the best steel for each part of the automobile to permit obtaining the desired physical properties. This means of control has been a great aid in the more efficient use of metal, thereby increasing the performance of the car.

As the size of the part to be heat treated increases, the speed at which it can be quenched decreases. As the speed of the quenching decreases, more alloy will be required in the steel to obtain full hardening. Plain carbon steel will harden satisfactorily in light sections, but varying amounts of alloy in the steel are necessary for heavier sections, depending on size.

ArmaSteel has a hardenability similar to low alloy steels and is suitable for full hardening up to ¾-in. diameter when oil quenched, or 1½-in. diameter when water quenched.

Machinability One Great Advantage

One of the greatest advantages in favor of castings is the possibility of placing metal exactly where it will do the most good. This eliminates considerable machining. The reduction of ma-



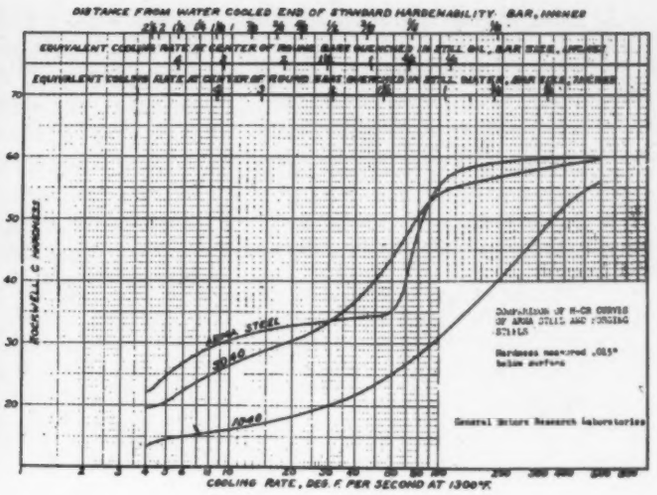


Fig. 15—(Left) Camshaft flame hardening machine. (Right) Comparison of hardness-cooling rate curves of ArmaSteel and forging steels.

chining operations severs one bottleneck in many plants. Machine chips are the most costly things to produce, and the most useless. One great contribution to the Defense Program which the casting industry can make is the time saved in the machining of castings vs. forgings. Up to 50 per cent in man hours per part is being saved in many ArmaSteel castings vs. forgings. This is possible by producing castings to closer tolerances than forgings, thereby machining less excess metal.

A considerable saving in tool life is effected in the machining of the castings due to less metal removed and an easier machinable metal.

ArmaSteel castings have the following advantages:

1. Uniform structure for greater strength, shock and stress resistance.
2. Metal distributed where it will do the most good, maximum strength, with minimum weight.
3. Widest range of physical properties.
4. Resistance to shock at subzero temperatures.
5. Response to localized hardening, with high hardenability rating and maximum wear resistance.
6. Good machining qualities, mirror finish, low finishing costs, better streamlined appearance.
7. High rigidity, maximum deflection, accurate alignment, close tolerances, better fits.
8. High fatigue resistance, maximum endurance and longer life. Ideal for critically stressed parts.

Figures 17, 18 and 19 illustrate some applications of ArmaSteel.

The pistons shown in Fig. 17-4 are used on diesel engine truck motors produced to a Brinell hardness of 197-241. The locomotive pistons shown in Fig. 17-5 are used on trans-continental streamline trains. The performance to date on these pistons has been remarkable. Many engines have reported upward to 1,000,000 miles without failure. Formerly, aluminum and gray iron pistons failed at low mileage.

Figure 17-6 shows examples of eccentric and throw-type refrigerator crankshafts. The eccentric type was formerly a 1112 or 1020 steel forging, carburized and hardened to a Rockwell "C" 60. The ArmaSteel shaft is produced to a Brinell range of 170-207. This machines readily. After machining, it is heated to 1550°F., held 30 min., oil quenched, and drawn back to 700°F. to a Rockwell "C" 40-45. The throw-type crankshafts were 1045 steel forgings, heat treated to a Brinell of 207-255. ArmaSteel shafts are supplied to a Brinell of 197-241 and receive no further heat treatment.

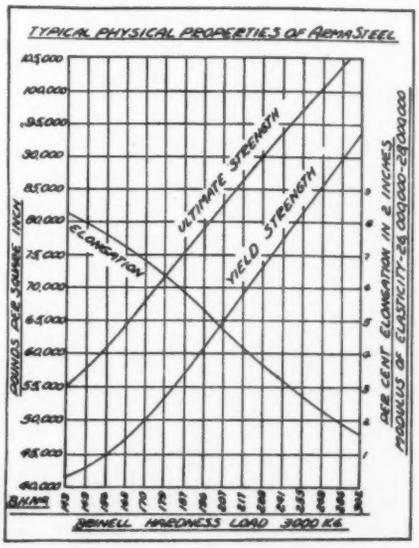


Fig. 16—Chart showing typical physical properties of ArmaSteel.

ArmaSteel pistons shown in Fig. 17-7, formerly produced from aluminum, are giving satisfactory service. Due to its greater strength, ArmaSteel can be machined to a thinner wall thickness and correspondingly lighter weight than gray iron. In general, a gray iron piston is 80 per cent heavier than aluminum; whereas, ArmaSteel is 45-50 per cent heavier. ArmaSteel pistons can be machined to equal the weight of aluminum, but this requires considerable machining.

Automobile Camshafts

Many advantages can be credited to ArmaSteel as a camshaft material, in addition to savings of pattern expense versus cost of forging dies. These advantages are:

1. Elimination of rough machining of cams.
2. Only one centering operation.

3. Less metal removed in machining.
4. Elimination of carburizing.
5. Better tool life.
6. Easier straightening.
7. Better production on existing equipment.
8. Less finished weight.
9. Added quietness to motor due to damping property.
10. Less handling and transportation due to straight line production.

Camshafts must resist wear and be sufficiently rigid to give a satisfactory low noise level. The strength of the camshafts is secondary in consideration because if the design and material used are sufficiently rigid it is inherently strong enough. Most of the automobile camshafts are 1020 steel carburized and hardened. ArmaSteel shafts are produced to a Brinell range of 197-241, and cams and gears either flame or induction hardened. Figure 17-8 shows several types of automobile camshafts.

Figure 18-1 shows an automotive clutch throw-out collar. This part was formerly a 1045 steel forging, hardened to Rockwell "C" 55 minimum. The present ArmaSteel casting is supplied at 197-241 Brinell, coined on the round surface, three holes drilled, hardened to 42-46 Rockwell "C," rough and finish ground on the flat side.

Figure 18-2 shows a washing machine gear. This gear was produced from different materials which did not give satisfactory service. ArmaSteel is supplied at

Fig. 17—1—Hydramatic transmission rear unit internal gearand Carrier. (Left) Forging weighing 6.45 lb. (Center) Rough casting weighing 5.2 lb. (Right) Machined casting weighing 2.6 lb. 2—Hydramatic transmission front unit drum. (Left) Forging weighing 8.2 lb. (Center) Rough casting weighing 5.7 lb. (Right) Machined casting weighing 3.3 lb. 3—Hydramatic transmission reverse internal gear. (Left) Forging weighing 8.4 lb. (Center) Rough casting weighing 7.5 lb. (Right) Machined casting weighing 4.8 lb. 4—Diesel pistons 4½ and 6-in. diameter for truck motors. 5—Locomotive diesel engine pistons. 6—Refrigerator crankshafts. 7—Automobile pistons. 8—Automobile camshafts.

300 Brinell, at which hardness the gear teeth are cut, and no further heat treatment is given. This part is an outstanding example of machinability of ArmaSteel at high hardness and is turning in a satisfactory performance record.

The rear propeller shaft flange and front universal joint yokes, shown in Figs. 18-3 and 18-4, were formerly made from a 1145 steel forging, quenched in oil and drawn to Brinell range of 255-302. Considerable trouble was experienced in broaching the splines. The ArmaSteel parts are produced to a Brinell hardness

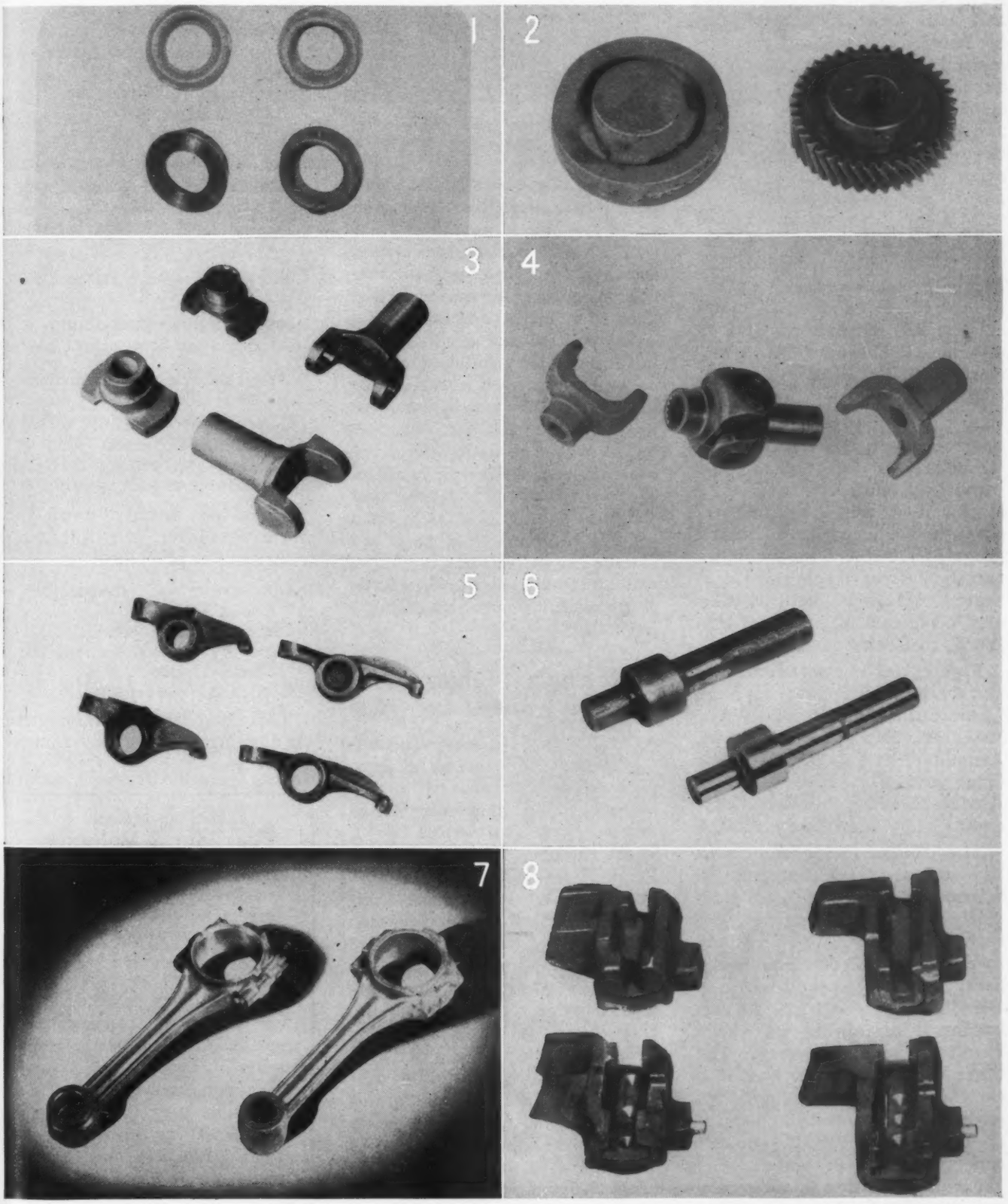


Fig. 18—1-Automotive clutch throw-out collar. 2—Washing machine gear. 3—Rear propeller shaft flange (left) and front universal joint yoke (right). 4—Universal joint yokes. 5—Automobile valve rocker arms. 6—Refrigerator crankshaft. 7—Automobile and refrigerator connecting rods. 8—Automotive transmission shifter forks.

of 207-255. Broaching operation has caused no trouble. This is a highly stressed part and has shown up very satisfactorily.

The automobile valve rocker arms, shown in Fig. 18-5, formerly were produced from 1020 steel, carburized and hardened, and also from 1035 steel and hardened. The pad end was immersed in lead pot and quenched in water. One customer prefers a soft ArmaSteel 143-179 Brinell and allows a little longer time of heating in the lead bath. The other customer specifies 179-207 Brinell and also quenches in oil from a lead bath, immersing the pad end only. Minimum 50 Rockwell "C" on pad is specified. The excellent non-seizing property of ArmaSteel in metal to metal contact has made it possible to eliminate the bronze bushing formerly used on the steel forging.

The refrigerator crankshaft, shown in Fig. 18-6, is called the eccentric type. It was formerly either 1112 or 1020 steel forging, carburized and hardened to a Rockwell "C" 60. The ArmaSteel shaft is produced to a Brinell range of 170-207. This machines readily. After machining it is heated to 1550°F., held 30 minutes, oil quenched, drawn back to 700°F. to Rockwell "C" 40-45.

Figure 18-7 shows automobile and refrigerator connecting rods. These formerly were forgings of 1035 steel. For refrigerator rods, ArmaSteel at 163-207 Brinell is being used. For automotive rods, ArmaSteel at 197-241 Brinell has shown very satisfactory results.

The shifter-forks, shown in Fig. 18-8, are used in automotive transmission. They were formerly 1035 steel forgings, gas carburized and hardened to to Rockwell "C" 60 . The ArmaSteel parts are produced to a Brinell range of 207-255. At this hardness, machining has been found to be satisfactory. The inner surface and one notch on each fork are flame hardened with an oxygen-acetylene burner by heating for 17 seconds and quenching in water. The hardening machine is automaitc, one man hardening better than 6500 forks from a machine in 8 hours.

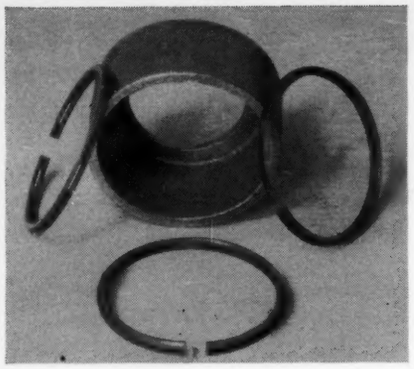


Fig. 19—Automotive piston ring pot with rings machined from it.

Figure 19 shows an automotive piston ring pot. Six piston rings are cut from the 2-in. of pot. The internal flange is used for chucking. The rings are machined and ground after slicing. Two advantages are outstanding on ArmaSteel piston rings. One is that the bore finish does not have to be honed as smooth, since the action of ArmaSteel smooths up the bore and has what is called a healing action—and the other is the ability to conform to the shape of the bore; the ring comes in quickly, that is, it seats promptly. ArmaSteel rings are referred to as "self-seating." The material is supplied to the piston ring manufacturer at 228-255 Brinell.

Explains Cost Under Government Contracts

THE War and Navy Departments have issued a pamphlet, obtainable from the Superintendent of Documents, Washington, D. C. (10 cents a copy), under the title, "Explanations of Principles for Determination of Costs Under Government Contracts." This explanation has been prepared to present in basic outline the principles according to which costs may be determined under contracts with the United States Government for supplies for the War and Navy Departments. The principles outlined are directed to the validity of items of costs as components of the total contract cost, without regard to their status or allowable deductions from taxable incomes.

The items of costs that enter into government contracts are classified and discussed as follows:

Manufacturing Costs

Direct shop costs:
- Materials and parts.
- Direct labor.
- Shop engineering expense.
- Other direct shop costs.

Indirect shop costs:
- Supplies and sundry materials.
- Indirect labor.
- Service and maintenance.
- Fixed charges.
- Other indirect shop costs.

Other manufacturing costs:
- Amortization of patents, purchased designs, etc.
- Engineering and development expenses.

Other Contract Performance Costs
- Delivery costs.
- Installation and servicing.
- Sundry specific contract costs.

Administration and Distribution Expenses
- General corporate and administration expenses.
- Bidding and selling and distribution expenses.

Following discussion of the above outline, the following points are reviewed:
- Limitation of Admissible Costs.
- Inadmissible Costs.
- Basis of Apportionment of Items of Costs.
- Contractor's Accounts.

This pamphlet is of interest to all foundries filling government contracts.

Help! Help! For Bound Volumes

The Association frequently has calls for copies of the Bound Volume Transactions of the Association published prior to 1938. These are in demand not only by individuals but by colleges and universities who wish to complete their libraries. Any members having bound volume copies of Transactions prior to 1938 for which they have no use, or firms having duplicate sets not at present in use, are requested to get in touch with the secretary of the Association, R. E. Kennedy, 222 W. Adams St., Chicago.

Foundry Industry Urged by General Hershey to Inventory Manpower Now!

TO KEEP war production going and at the same time furnish men for the armed forces, all industrial employers are being urged by Maj. Gen. Lewis B. Hershey, U.S.A., Director of Selective Service, to make a prompt inventory, appraisal and analysis of the manpower in each plant, the same as inventories are taken of a plant's stock pile. An abstract of an article by General Hershey in the October issue of *Mechanical Engineering*, of interest to every employer of skilled labor, follows:

Manpower is a most important strategic material of today Every employer should make a prompt inventory, appraisal, and analysis of the man power in his own plant as he would inventory his stock pile. In order to keep production going and at the same time furnish men for the armed forces, industry should now establish an orderly replacement program.

In order to secure temporary deferments for essential men while he is training women, young men, older men, men physically handicapped or those with a high degree of dependency, the employer should know the fundamental principles in the operation of his local Selective Service Board. Certain steps should now be taken by each employer.

He should know how many men on his pay roll are between the ages of 20 and 45. He should investigate the classification of every one of those men. On the basis of such an inventory he should prepare to plan ahead and train men for replacement of those who must necessarily enter the armed forces if we are to have the sort of army which can win the war.

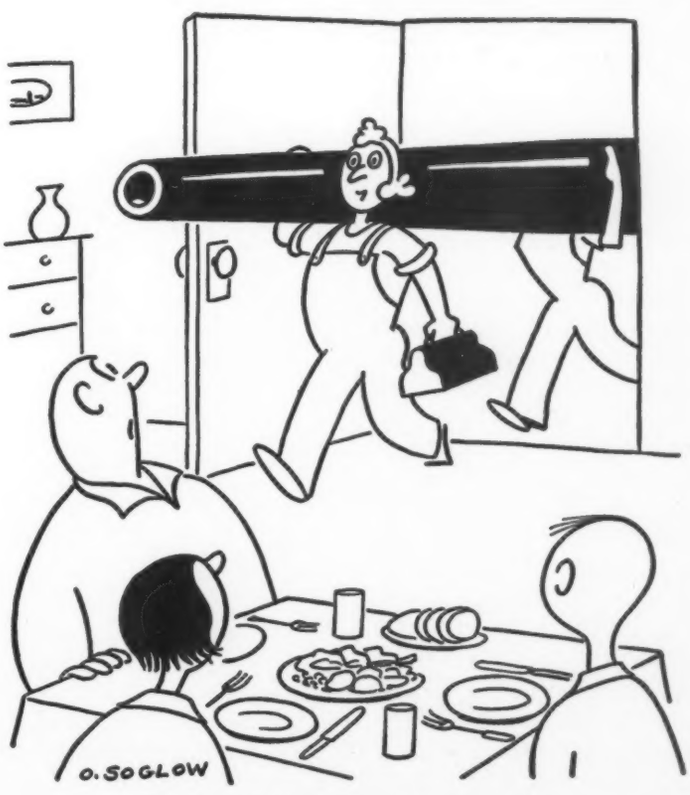
Deferments Temporary

Deferments, granted so that employers may train women or men not liable to early induction, are temporary deferments; they cannot exceed six months and in many cases may be for only 30, 60, or 90 days. The Army today has to train a bomber pilot within a period of eight months to operate a very technical machine with an instrument board which puzzles an expert. Why, therefore, should industry insist that it assume that it can take two or three years to train men for industrial tasks not nearly so complicated?

The fundamental purpose of every deferment of a registrant is to allow an employer to train a replacement. Only in a few rare instances can an employer expect to have these temporary deferments continued for more than the six-months' period. These are only in cases where an abnormally long period of training is required for a replacement and the eight months needed in which a bomber pilot can be turned out now is something to remember in this connection.

Definite Duty

A double duty rests upon the employer. He should personally know what his man power situation is. He should not leave the job to a minor employee to decide who is necessary. The employer who delegates the task of filing a request for deferment to a clerk, the executive who does not make a complete inventory of his whole plant today, is negligent. Likewise, the employer who files requests for deferment of men who can be replaced by women, or others, is keeping reinforcements out of an Army which is battling for us all. The employer engaged in essential war production who has been required to greatly expand his plant and who then fails to request deferment for his key men is also negligent.



"We brought back some home work."

Drawn for the Office of War Information

A good rule to follow: *Don't ask deferments for any men who can be replaced by training another individual not likely to be eligible soon for service in the armed forces.*

Make an inventory, request deferment for any man whose immediate going into the armed services would retard production of vital war material or other services essential to the war effort, or who is needed to maintain national health, safety, and interest.

Only when an employee is working in a critical occupation within an essential industry should a Form 42A be filed for his temporary occupational deferment.

Make Replacements

Yes, an inventory within a man's own plant is called for; also an appraisal and analysis of the man power in the community. There is many a man over 45, or a man physically handicapped, or a woman who can do that job that the 23-year-old boy is doing who took a 12-weeks' course at a learn-quick school.

There are not more than sixty million people in this country who are capable of effective productive effort. These men and women represent our total man power available to win the war.

They must do everything that must be done in a total war; maintain transportation, communications, and utility systems, maintain public services, grow food for ourselves and our allies, mine the metals and produce the raw materials, fabricate and produce the amount of consumers' goods necessary to maintain even a restricted national life and the supplies, weapons, and munitions of war; also most of all they must provide the men who land on strange shores in far places, the men who carry the fight to the enemy on a multitude of far-flung frontiers.

The rest of the population who mine raw materials and produce the weapons with which these men fight must be a self-disciplined team working in unity. The individual personal convenience, comfort, or pleasure, or the convenience and ordinary leisurely replacement programs of the employer will have to be given progressively less consideration as the war gets tougher and the casualty lists grow.

When we hear of the big armies we are going to raise, we must all remember that it takes at least five men or women to produce what they eat, use, fight with, and wear. With less than sixty million availables in this country, those figures are worth deep consideration.

More Members A.F.A. Committees Appointed

COMPLETE personnel of A.F.A. National Committees for 1942-43 were announced in the October issues of *American Foundryman,* pages 17-24, as appointed to September 30. Since then several additional committee members have been appointed, as follows:

Apprentice Training Committee—

E. P. Meyer, general superintendent, Chain Belt Co., Milwaukee, Wis.

Aluminum & Magnesium Division

Advisory Committee—

J. G. G. Frost, president, Aluminum & Magnesium, Inc., Sandusky, Ohio.

Gray Iron Division

Committee on High Temperature Properties of Cast Iron—

T. E. Eagan, chief metallurgist, Cooper Bessemer Corp., Grove City, Pa.

Howard S. Avery, research metallurgist, American Brake Shoe & Foundry Co., Mahwah, N. J.

Meets to Correlate All A.F.A. Activities

A MEETING of the Technical Activities Correlation Committee of your Association, under the chairmanship of Fred J. Walls, International Nickel Co., Detroit, was held in Cleveland during the National Metals Congress for the purpose of discussing and correlating the various technical activities of the Association. Membership of the present committee is composed of three members of the A.F.A. Board of Directors, two past members of the Board, with chairmen of the various divisions and important general interest committees as conferees.

Discussions at the meeting emphasized the need for attention to war production problems of the industry. Each division chairman present reported on some of the problems affecting his particular branch of the industry and suggested ways and means to focus attention and secure information concerning them. The need for education among practicing and embryo engineers was discussed at length, and attention was called to the National Essay Contest being conducted by the Committee on Co-operation with Engineering Schools.

The use of regular A.F.A. publications in disseminating information on war problems and how they could be used to cooperate with the government received attention. A suggestion was offered for the creation of a committee to study the use of statistics for the promotion of a better understanding of variables in the foundry industry and their control.

Form New A.F.A. Group To Study Cast Iron

THE Gray Iron Division of your Association has formed a new Committee on High Temperature Properties of Cast Iron. The new committee is under the chairmanship of R. J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J., a director of A.F.A.

The above committee held its first meeting during the recent convention of the American Society for Metals in Cleveland to discuss the trend of its activities. As a result of discussion, it was decided to conduct an extended survey on the present information available on the use of cast iron at elevated temperatures and the possibility of more extensive use of that material in light of developments in high strength and heat resistance.

The Effect of Six Grains of Sand

By Leo J. T. Brom,* Winona, Minn.

For many years, conscientious foundry sand research men have been advocating the importance of foundry and core sand control, and many highly technical papers have been published on the subject. Here, however, in the following article, is one of the most unique and easily understandable examples of the importance of sand control published in some time. In this case, it was found that certain core failures actually were due to displacement of the equivalent of only six grains of sand.

OUR foundry was confronted with the problem of obtaining the correct sand mixture for sand blast nozzle cores. The author, who was completing his studies at the University of Minnesota, took his problem to the Foundry Control Laboratory under the able direction of H. F. Scobie.

The cores are 4⅛ in. long, including the prints, ⅛-in. in diameter in the stem end, and ½-in. in diameter in the bell end. To pour the nozzle horizontally, a No. 16 gauge wire is placed in the center of the core to give the required transverse strength. The sand is blown into the bell end through two blow holes, one on each side of the parting line.

To produce the blown core with a smooth finish and sufficient permeability to make venting unnecessary, a poorly sorted sand was desired. Such a sand should have about equal weights retained on the 40, 50, 70, 100 and 140 mesh sieves. A survey of the core sands available in Minnesota showed that a blend of two-thirds Van Oser member of Jordan Sandstone and one-third Eau Claire member of the Dresbach Sandstone would give the necessary grain distribution. Screen analysis of this mixture is shown in Table 1.

The sand was mixed with oil to about 45:1 by volume with no cereal binder or water added. With the absence of green strength, good blowability was obtained; yet the cores did not sag because they were baked on a dryer. With this sand mixture, a number of boxes were blown.

A large percentage of these cores did not completely fill the stem, leaving a void just below the bell. Upon examination with a magnifying glass, it was seen that the cause in every case was due to a large grain or two lodging at the top of the stem, which prevented the proper filling of the core below that point.

Table 1
Screen Analysis of Sand for Sand Blast Nozzle Cores

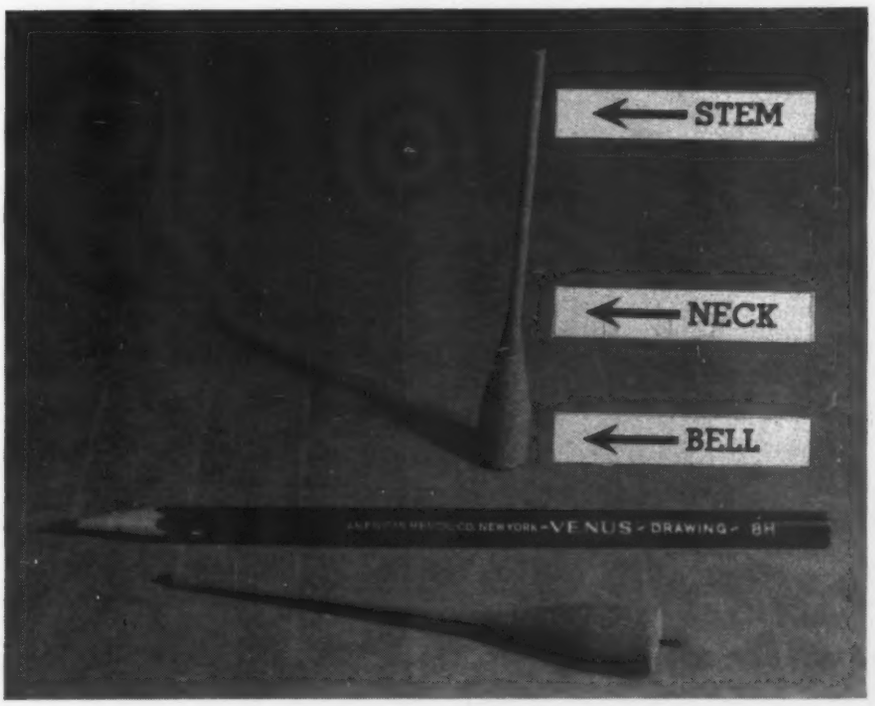
Sieve	*Per Cent*
20	0.4
30	6.5
40	16.8
50	18.8
70	21.1
100	19.8
140	12.3
200	3.3
270	.2
Pan	.3
Clay	.7

Six Grains Block Stem

Simple arithmetic proved that the space for the sand between the wire and the walls of the box amounted to 0.038-in. This is less than the diameter of a No. 18 wire. Since the openings in a 20 mesh screen are 0.033-in., the 0.4 per cent of this material in the screen analysis must be the source of the trouble. This 0.4 per cent may seem to be an insignificant factor, but with the aid of an analytical balance and a slide rule, the 0.4 per cent of the weight of the material in the stem becomes six grains of sand. These six grains in the strategic positions could sabotage the blowing of this little core.

Experimentally, the sand for the next batch of cores was passed through the standard 20 mesh screen, discarding the material that was retained. Cores blown using this sand in the mixture were decidedly better, but quite often they too still did not blow because of a few large grains.

There was no hole in the screen, so another source of contamination was sought. The absence of scientific cleanliness was rooted out as this malefactor. Enough sand from a previous mix was adhering to the walls of the mixer and the blower to introduce the large grains. Scrupulous cleaning of all the



Core for white iron sandblast nozzle, showing relative size (4⅛ inches) in comparison with an ordinary pencil.

*Frank J. Brom Machine & Foundry Co.,

equipment was the final touch to the sand problem.

All Sand Screened

To screen all of the sand through a standard screen is unusual in ordinary foundry practice. However, it must be remembered that the cores are very small, and a few moments of screening the dry sand will provide enough sand for an entire day's operation of each blower. Today, the core scrap is less than 1 per cent with the principle cause being a bend of less than 1/32-in. in the core wire used.

Thus with the aid of a Sherlock Holmes control laboratory, "Six Grains of Sand" faced the firing squad of a foundry practice with analytical cleanliness and research precision. Production rolls on.

Random Comments

WE had the opportunity of attending the annual convention of the American Society for Metals in Cleveland during the week of October 12. As had been anticipated, the attendance was very large because today men of industry want all the information they can get with regard to production. Conventions staged for the advancement of industry in general are increasing the production of armaments and reducing scrap losses, thus assisting in material conservation.

That the war value of such gatherings of technical and production men is becoming more generally recognized, is evidenced by an editorial in the October 14 issue of the *Cleveland Plain Dealer,* which read in part as follows:

> "It is safe to say that aside from the national political conventions, none has ever been as important to the country as the one now being held at Public Hall. The 10,000 delegates now in our midst are not here for fun. They came as leaders of a home front army to exchange and pool information of value in carrying out their end of the war."

The scope of the A.S.M. convention was very wide, since it covered many of the metal working industries. The next convention of A.F.A. will hold even more significance. This will be a convention devoted to increasing the production and quality of the product of a single industry—YOUR INDUSTRY. Its only business will be that of finding ways and means of increasing castings production and application to aid in the defeat of the enemies of the United States.

METAL CONTAMINATION

AT the meeting of the Advisory Committee of the Brass and Bronze Division of A.F.A., held in Cleveland during the recent A.S.M. convention, one point of particular interest to non-ferrous foundrymen was brought out. Due to the scrap situation and the lack of appreciation on the part of some foundrymen that segregation of scrap in non-ferrous foundries is essential, a condition has been brought about that tends to impair the war effort.

One of the problems that is beginning to be evident is the contamination of red metal scrap with silicon. In many instances, only a minute percentage of silicon seriously impairs the physical properties of certain copper-base non-ferrous alloys. Therefore, non-ferrous foundries can contribute to increasing the war effort and conserving materials if they will exercise care in the segregation of their scrap in individual shops.

THE CHANCE OF A LIFE TIME

IN one of the committee meetings held in Cleveland recently, a member of your Association made a statement to the effect that the foundry industry and castings in particular, have the chance of a life time. The government is interested in increasing the production of castings.

Authorities have knowledge of the fact that, as a whole, the foundry industry has excess capacity. This may not be true of the steel or non-ferrous branches of the industry, but according to latest information it is true of the gray iron and malleable iron branches, although the latter is increasing in activity. The same individual made the statement that the authorities are willing to consider changing specifications and designs, giving greater latitude in requirements, and are willing to be shown that castings can do the job.

Now is an opportunity for the industry to capitalize and increase its contribution to the war effort. Whether this will be done or not, depends on whether foundrymen as a whole are go-getters or whether they still adhere to the more or less in-grained attitude that the customers shall come to them.

If we wait, the opportunity may be lost. Let's all put our shoulders to the wheel to increase the production of castings—not *gray iron castings,* not *steel* castings, not *brass, bronze, aluminum* or *malleable* castings —but CASTINGS. If the industry adopts this attitude, each branch will secure its just proportion of tonnage and can make an increasing contribution toward the war. Here's an opportunity—*Let's go!*

GRAY IRON FOUNDERS' SOCIETY CONVENES

AT the invitation of the Board of Directors of the Gray Iron Founders' Society, A.F.A. Executive Vice-President C. E. Westover attended the annual meeting of that organization held October 9 in Cleveland. Upon his return to the National office, Mr. Westover reported an enthusiastic gathering with a record attendance, indicating the wide interest of gray iron foundry management in current problems of the industry. The sessions were addressed by the heads of various branches of O.P.A. and W.P.B. on Government regulations, particularly affecting the gray iron foundry industry.

GUNG HO

WE BET you don't know what it means, but it is the slogan of the Chinese industrial associations. This fact was discovered by Geo. F. Mullen, Editor, *Canada's Foundry Journal,* and published in the August 1942 issue of that magazine. The interpretation of the slogan is:

> "Together is a beginning,
> Keeping together is progress,
> Thinking together is unity,
> Working together is success."

This comes pretty close to the motto of the A.F.A. The first two and the last lines are almost identical with the A.F.A. motto. Possibly we ought to add the third line. It is worth thinking about.

Orders of the Day--and Tomorrow

Navy Issues Steel Radiograph Standards

RADIOGRAPHIC standards for steel castings for pressure service have been issued by the Bureau of Ships, Navy Department, Washington, D. C., dated July 1, 1942. The standards are contained in a looseleaf book of 64 pages, in most cases showing unacceptable or border line cases, and acceptable examples.

Subject matter is divided into seven groups, according to type of defect, covering gas and blowholes, sand spots and inclusions, internal shrinkage, hot tears, cracks, unfused chaplets, and internal chills. Castings are grouped into five classifications according to service requirements, size, wall thickness, etc.

The present standards follow original standards issued in 1938 and discussed before the Steel Division session at the 1939 A.F.A. Convention, by N. A. Kahn, Brooklyn Navy Yard, Brooklyn, N. Y. Copies of the standards are not available for general distribution, but have been issued to all inspectors of navy material, inspectors of naval machinery, and supervisors of naval shipbuilding, through whom arrangements can be made for their inspection, according to the Bureau of Ships.

Name Transportation Priority Authority

ALL transportation priorities, both domestic and import, have been consolidated in a new Division of Stockpiling and Transportation, according to an announcement dated October 20 by A. I. Henderson, Deputy Director General for Industry Operations, W.P.B. The new division will work with ODT to secure greater efficiency in use of transportation facilities by recommending curtailment or elimination of unnecessary long hauls, uneconomical routing, cross-hauls, etc., and has authority to work out systems of transportation priorities, and promote the safety of stocks of strategic and critical materials in storage.

Dr. W. Y. Elliott, former chief of the Stockpile and Shipping Imports branch of WPB, will be Director of the new division.

Use of Automotive "Parts" Restricted

UNDER provisions of General Order No. 21 issued by the Office of Defense Transportation, and effective November 15, 1942, restrictions on purchase, installation or mounting of "parts" on commercial motor vehicles was further broadened to include hoists, cranes, winches, tanks, bodies, etc., according to announcement dated October 20 by J. G. Scott, general counsel for ODT.

The ruling dated October 20 prohibits purchasing, installing or mounting, either permanently or temporarily, of the above mentioned truck and passenger car parts without first obtaining a Certificate of War Necessity for the vehicle on which the part is to be installed or mounted. The order is equally binding on the person who performs the work as well as on the purchaser of the equipment.

Foundrymen Named to New Production Group

ANNOUNCEMENT was made October 19 by the Office of War Information, WPB, that the heads of two A.F.A. member companies were recently appointed to the Policy Committee of the new and important War Production Drive Headquarters created recently by Donald M. Nelson, Chief of WPB, for increasing production throughout the country. O. A. Seyferth, president, Western Michigan Steel Foundry Co., Muskegon, Mich., was nominated for recognition by the U.S. Chamber of Commerce. H. C. Beaver, president, Worthington Pump & Machinery Corp., New York City, was nominated by the National Association of Manufacturers.

The War Production Drive organization is seeking to sustain and increase war production through some 1,650 labor-management committees covering 3,200,000 workers. Policies of the drive are first determined by the Policy Committee, of which W. G. Marshall is chairman as well as director of the Drive Headquarters.

How to File Appeals from W.P.B. Orders

EFFECTIVE October 22, 1942, under terms of Priorities Regulation No. 16, appeals by manufacturers for relief from restrictions imposed by certain limitation and conservation orders issued by W.P.B. must be filed only in W.P.B. field offices, according to the Office of War Information for the Board. An appendix to the new regulation lists orders thus to be appealed, including the following of more or less interest to the foundry industry:

L-5-c	Domestic mechanical refrigerators.
L-6-c	Domestic laundry equipment.
L-18-b	Domestic vacuum cleaners.
L-21, 21-a	Phonographs, etc.
L-27-a	Vending machines.
L-29	Metal signs.
L-33	Portable electric lamps.
L-59	Metal plastering bases.
L-64	Caskets, etc.
L-77	Metal windows.
L-78	Fluorescent lighting fixtures.
L-80	Outboard motors.
L-81	Toys and games.
L-83	Industrial machinery.
L-91	Commercial laundry equipment.
L-93	Golf clubs.
L-98	Domestic sewing machines.
L-108	Metal working equipment.
M-11-b	Zinc.
M-126	Iron and Steel.

The new regulation requires the use of Form PD-50 when filing an appeal. Appeals from orders not included in the appendix should be filed directly with W.P.B. in Washington, D. C., and if no particular form is prescribed the appeal should be filed by letter in triplicate.

New Members

With the beginning of the new Fall schedules of chapter meetings, chapter membership activities have materially quickened. The list below shows 139 New Members, a total covering the month August 16-September 15, with 20 chapters represented in the total. Only 4 chapters did not report new members, as follows: Central New York, Michiana, Southern California, and the University of Minnesota Student Chapter.

(September 16 to October 15, 1942)

Conversions:

Company from Personal—

L. A. Cohn & Bro. Inc., Chicago, Ill. (Max S. Cohn, Sec'y-Treas.)

United Smelting & Refining Co., Hamilton, Ont. (G. B. Young, Mgr.)

Birmingham District Chapter

W. K. Bach, Salesman, Foundry Service Co., Birmingham, Ala.

D. L. Booker, National Cast Iron Pipe Co., Birmingham.

Central Indiana Chapter

Fred E. Fishman, Indianapolis, Ind., Sales Engr., L. A. Cohn & Bro., Inc., Chicago.

Victor E. Howell, Sand Tech., Perfect Circle Co., New Castle, Ind.

Albert Moseman, Partner, Federal Pattern Works, Indianapolis, Ind.

Marvel Tarr, Molding Dept. Head, Perfect Circle Co., New Castle.

Chesapeake Chapter

J. L. McCleary, Purch. Agent, Frick Co., Waynesboro, Pa.

Chicago Chapter

Andy Berntsen, Patt. Maker, Hansell-Elcock Co., Chicago.

Carl K. Evans, Fdry. Appr., Continental Roll & Steel Foundry Co., East Chicago, Ind.

Eugene F. Galvin, Pres., Market Engineering Associates, Chicago.

James M. Murray, Fdry. Foreman, Continental Roll & Steel Foundry Co., East Chicago.

William A. Norton, Fdry. Foreman, Continental Roll & Steel Foundry Co., East Chicago.

Frank H. Poettgen, Supv., American Steel Foundries, East Chicago.

Francis P. Quinn, Process Engr., American Steel Foundries, East Chicago.

Lewis D. Reiff, Gen'l Fdry. Foreman, American Steel Foundries, East Chicago.

Ivan L. Tudor, Foreman, Continental Roll & Steel Foundry Co., East Chicago.

Cincinnati District Chapter

A. P. Fischer, Service, E. F. Houghton & Co., Cincinnati, Ohio

Charles W. Kerr, Junior Met., Wright Aeronautical Corp., Lockland, Ohio

Alfred R. Mustard, Ass't Foreman, Wright Aeronautical Corp., Lockland

Detroit Chapter

David William Burton, Met., Aluminum Co. of America, Detroit, Mich.

John Patrick De Fronzo, Budd Wheel Co., Detroit

Milton A. Meier, Owner, Milton A. Meier Co., Detroit

George A. Schumacher, Met., Albion Malleable Iron Co., Albion, Mich.

Eastern Canada and Newfoundland Chapter

John B. Angel, United Nail & Foundry Co., St. John, Newfoundland

Karl C. Baker, Sales Mgr., Canada Metal Co., Ltd., Montreal, Que., Canada

G. C. Barclay, Webster & Sons, Ltd., Montreal

***R. W. Bartram Co., Montreal (Robert W. Bartram.)**

***Belanger, Ltd., Montreal (A. D. Paquet, Repr.)**

Henry William Bennett, Brass Fdry. Supt., Dominion Engineering Works, Ltd., Montreal

Geo. Bott, Electric Steels, Ltd., Cap de la Madeleine, Que., Canada

William Bradley, Foreman, Dominion Engineering Works, Ltd., Montreal

W. J. Brown, R. W. Bartram Co., Montreal

****Canadian Car & Foundry Co., Longue Pointe, Que. (C. F. Pascoe, Repr.)**

***Canadian Pattern & Wood Working Co., Montreal (Ed. Laurendeau, Partner.)**

Bernard Collitt, Met., Jenkins Bros. Limited, Montreal

***Darling Brothers Limited, Montreal (W. G. Hole, Mgr., Air Filter Division.)**

John F. Dauncey, Fdry. Supt., Superheater Co., Ltd., Sherbrooke, Que., Canada

P. A. Dauncey, Fdry. Supt., Canadian Ingersoll-Rand Co. Ltd., Sherbrooke

***Dominion Steel & Coal Corp., Sydney, N.S., Canada (George Beaton, Mech. Supt.)**

David Garroway Durlop, Sales-Service, Canadian Fdry. Supplies & Equipment Ltd., Montreal

***La Compagnie Dussault & Lamoureux, St. Hyacinthe, Que. (J. Ovide Bertrand, Secy-Treas.)**

***Empire Brass Foundry (R. Bruce, Repr.)**

Thos. Ferguson, Partner, Canadian Pattern & Wood Working Co., Montreal

R. J. Ferguson, R. J. Ferguson & Sons, Ottawa, Ont.

W. E. Foreman, Electric Steels, Ltd., Cap de la Madeleine

L. Guilmette, Sales-Service, Canadian Fdry. Supplies & Equipment Ltd., Montreal

W. E. Hillis, Hillis & Sons, Ltd., Halifax, N.S., Canada

***La Fonderie de L'Islet, Limitee, L'Islet Station, Que. (J. Ed. Thibault, Vice-Pres.)**

C. K. Lockwood, Met. Engr., Shawinigan Chemicals Ltd., Montreal

***McDonald Metal Co., Waterloo, Ont. (O. L. Lewis)**

John McVey, Ass't Supt., Jenkins Bros. Ltd., Montreal

James Harwood Newman, Sales-Service, Canadian Fdry. Supplies & Equipment Ltd., Montreal

***Ottawa Car & Aircraft Ltd., Ottawa, Ont. (W. L. Bond.)**

Henri Proulx, Moulder, J. A. Gosselin Co., Ltd., Drummondville, Que., Canada

***Quebec Brass & Iron Co., Levis, Que., Canada (L. Saindon, Repr.)**

Henri Rouleau, Rouleau Ltee., Mont Joli, Que., Canada

***St. John Iron Works, St. John, N.B. (G. E. Howard.)**

***Shawinigan Chemicals Ltd., Montreal. (C. M. Carmichael, Gen'l Mgr.)**

***Thompson Bros. (H. Earl Thompson, Repr.)**

***Volcano Limited, St. Hyacinthe, Que., Canada, (S. A. Cyr, Prod. Engr.)**

Harry Walford, Mgr., H. Walford Limited, Montreal

***Webster & Sons Ltd., Montreal (Andrew R. Webster.)**

Metropolitan Chapter

Craig C. Hill, Red Bank, N. J. (Eastern Sales Mgr.) Pennsylvania Glass Sand Corp.

James P. McLaughlin, New York, N. Y. (Salesman) Sterling Wheelbarrow Co., Milwaukee, Wis.

E. V. Roberts, Chief Met., American Steel Castings Co., Newark, N. J.

Edward H. Schlinck, Chief Sand Tech., Capitol Foundry Co., Astoria, L. I., New York

Northeastern Ohio Chapter

Wm. B. Cohen, Gen'l Mgr., Metal Concentrating Co., Cleveland

Louis Kristoff, Chief Chemist, National Aluminum Cylinder Head, Cleveland

Joseph Manwell, Molder Foreman, Fulton Foundry & Machine Co., Cleveland

H. E. Reynolds, Dist. Mgr., Whiting Corporation, Pittsburgh, Pa.

***Ryder Brass Foundry Co., Bucyrus, Ohio (P. H. Ryder, Pres.)**

Northern California Chapter

Edgar L. Bloomster, Industrial Engineer, San Francisco

** Sustaining Members.
* Company Members

Charles F. Foster, Steel Fdry. Foreman, General Metals Corp., Oakland, Calif.
Fred C. Rudisill, Inventory Control, Enterprise Engine & Fdry Co., So. San Francisco

Northern Illinois-Southern Wisconsin Chapter

H. A. Steinbrink, Foreman, Gunite Foundries Corp., Rockford, Ill.

Ontario Chapter

*Coulter Copper & Brass Co., Ltd., Toronto, Ont., Canada (Thomas Myatt, Fdry. Supv.)
Wilfred Gratton, Owner & Moulder, Gratton's Aluminum, Toronto
J. McHutchion, Fdry. Foreman, Waterous Ltd., Brantford, Ont., Canada

Philadelphia Chapter

Howard Linn Edsall, Adv. Mgr., Ajax Metal Co., Philadelphia, Pa.
Technical Library, Lukenweld, Inc., Coatesville, Pa.

Quad-City Chapter

Robert Cale, Zimmerman Steel Casting Co., Bettendorf, Iowa
G. Fladlun, Molding Foreman, Zimmerman Steel Casting Co., Bettendorf
S. D. Freharne, Zimmerman Steel Casting Co., Bettendorf
Geo. E. Gregg, Sales Mgr., Zimmerman Steel Casting Co., Bettendorf
F. G. Kallous, Zimmerman Steel Casting Co., Bettendorf
H. V. McCluskey, Zimmerman Steel Casting Co., Bettendorf
R. Reimers, Patt. Foreman, Zimmerman Steel Casting Co., Bettendorf
Henry Roeh, Zimmerman Steel Casting Co., Bettendorf
Jake Shano, Zimmerman Steel Casting Co., Bettendorf
Wm. V. Toepel, Sec'y-Treas., Dubuque Foundry Corp., Dubuque, Iowa
Ernest E. Zimmerman, Furnace Supt., Zimmerman Steel Casting Co., Bettendorf
John E. Zimmerman, Zimmerman Steel Casting Co., Bettendorf
*Zimmerman Steel Casting Co., Bettendorf (F. W. Zimmerman, Gen'l Mgr.)

St. Louis District Chapter

H. E. Copeland, Sr., Fdry. Supt., Walworth Co., Washington Park Works, Ill.
Bernard J. Esarey, Engr. & Met., National Bearing Metals Corp., St. Louis, Mo.
*General Steel Castings Corp. Armor Plant, Madison, Ill. (Karl S. Howard, Wks. Mgr.)
Romeo Molla, Foreman, Semi-Steel Casting Co., St. Louis
*Southern Alloy Foundry, St. Louis (Louis C. Strotz, Partner.)

Toledo Chapter

Albert Dewey, Dewey Pattern Works, Toledo, Ohio

Twin-City Chapter

Walter H. Schulte, Branch Mgr., Federated Metals Div., American Smelting & Refining Co., Minneapolis, Minn.

Western Michigan Chapter

William S. Antisdale, Jr., Melting Supv., Campbell, Wyant & Cannon Fdry. Co., Muskegon, Mich.
Ira Eugene Cruse, Core Room Supt., Campbell, Wyant & Cannon Foundry Co., Muskegon
Clarence De Long, Cast Iron Melting Foreman, Lakey Foundry & Machine Co., Muskegon
Arthur R. Johnson, Sand Research & Control, Campbell, Wyant & Cannon Foundry Co., Muskegon
Walter M. Klaus, Steel Melting Foreman, Lakey Foundry & Machine Co., Muskegon
Ray Reiter, Lakey Foundry & Machine Co., Muskegon

Western New York Chapter

Albert Mathieu, Gen'l Foreman, Dussault Foundry, Lockport, N. Y.
E. C. Roseberry, Sales Mgr., Hartzell Propeller Fan Co., Buffalo, N. Y.
*Simonds Saw & Steel Co., Lockport (A. F. Wolf)

Wisconsin Chapter

Joseph Alagna, Fdry. Inspector, Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Harold O. Boehm, Fdry. Clerk, Allis-Chalmers Mfg. Co., Milwaukee
James F. Bork, Bucyrus-Erie Co., South Milwaukee, Wis.
Rex Ford, Core Room Foreman, International Harvester Co., Milwaukee
Albert Gerstmeier, Foreman, Standard Brass Works, Milwaukee
Frank J. Gey, Jr., Ampco Metal, Inc., Milwaukee
Archie G. Gordon, Time Study Foreman, Allis-Chalmers Mfg. Co., Milwaukee
Frank Hamachek, 3rd., Ass't Mgr., Frank Hamachek Machine Co., Kewaunee, Wis.
Cecil J. Hoffmann, Foreman, Bucyrus-Erie Co., South Milwaukee
John F. Klement, Ass't Met., Ampco Metal, Inc., Milwaukee
Francis L. Limacher, Patt. Shop Foreman, Bucyrus-Erie Co., So. Milwaukee
Leo F. Limbach, Fdry. Foreman, Frost Co., Kenosha.
Wm. J. MacKnight, Bucyrus-Erie Co., South Milwaukee
Marvin E. Nevins, Jr., Ampco Metal, Inc., Milwaukee
John Pintar, Core Room Foreman, Allis-Chalmers Mfg. Co., Milwaukee
Joseph J. Pueringer, Foundry Foreman, Sivyer Steel Casting Co., Milwaukee
M. W. Schneider, Vice-Pres., State Foundry & Machine Co., Cedar Grove, Wis.
*State Foundry & Machine Co., Cedar Grove (Edward M. State, President.)
Earl J. Strange, Allis-Chalmers Mfg. Co., Milwaukee
Albert E. Straubel, Patt. Maker, Lakeside Malleable Casting Co., Racine, Wis.
Harry Van Roosenbeck, Fdry. Supt., State Foundry & Machine Co., Cedar Grove
Leland Woehlke, Spring City Foundry, Waukesha

Outside of Chapter

M. D. Bensley, Ass't to Pres., Shenango-Penn Mold Co., Dover, Ohio
N. D. Cooper, Cooper Engrg., Ltd., Satara, India
Jack P. CoVan, Instructor, University of Illinois, Urbana, Ill.
*F. W. Dixon Co., Cambridge, Mass. (Merton F. Dixon, Pres. & Treas.)
Charles W. Hutchins, Gen'l Mgr., Standard Foundry Co., Worcester, Mass.
Evan J. R. Mitchell, Chief Met., Rolls-Royce Ltd., Glasgow, Scotland
Douglas Cooper Scott, Chief Draftsman, American Steel Foundries, Verona, Pa.

Wisconsin Shooting at 500 Member Mark

UNDER the leadership of Leon Decker, Allis-Chalmers Mfg. Co., West Allis, Wis., new chairman of the Membership committee, the Wisconsin chapter of A.F.A. began its new Fall season with an increase of 21 new memberships and has now announced a goal of 500 members to be reached within the next 60 days. Efforts of all present members have been requested to make and exceed this goal.

Wisconsin chapter's highest membership total of 416 was reached last season, for which a great share of credit must go to the membership committee chairman at that time, Wm. A. Hambley, Allis Chalmers Mfg. Co., West Allis. Chairman Decker and his membership group lost no time this season in acquiring 21 new members as an incentive to the goal that has been set for the chapter.

CHAPTER OFFICERS

A. S. Holberg
Alabama City Products Co.
Birmingham, Ala.
Director
Birmingham Chapter

W. A. Rengering
Cincinnati Milling Machine Co.,
Cincinnati, Ohio
Director
Cincinnati Chapter

R. A. Clark
Lakey Foundry & Machine Co.,
Muskegon, Mich.
Director
Western Michigan Chapter

C. E. Silver
Michigan Steel Casting Co.,
Detroit, Mich.
Director
Detroit Chapter

Wm. Gilbert, Jr.
Buckeye Foundry Co.,
Cincinnati, Ohio
Director
Cincinnati Chapter

Geo. H. James
American Engineering Co.,
Philadelphia, Pa.
Director
Philadelphia Chapter

J. F. Staver
Staver Foundry Co.,
Virginia, Minn.
Director
Twin City Chapter

L. Brown
Magnesium Fabricators, Inc.,
Toledo, Ohio
Director
Toledo Chapter

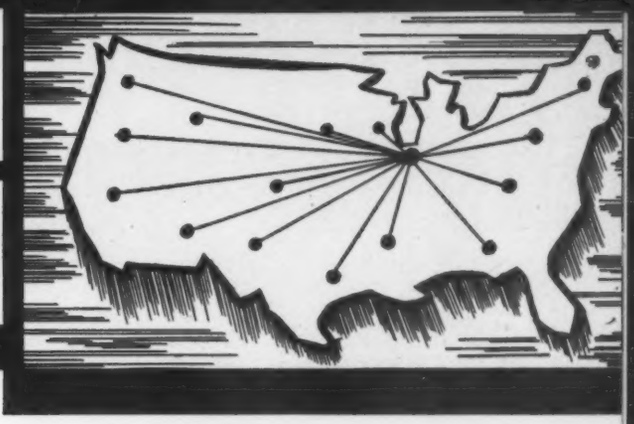
Floyd F. Ensign
Ensign Foundry Co., Toledo, Ohio
Director
Toledo Chapter

H. W. Downs, Jr.
Union Screen Plate Co. of
Canada, Ltd., Lennoxville, Que.
Director
Eastern Canada and
Newfoundland Chapter

O. E. Sundstedt
General Foundry & Mfg. Co.,
Flint, Mich.
Director
Detroit Chapter

J. C. Stavert
Babcock-Wilcox & Goldie-
McCulloch, Ltd., Galt, Ontario
Director
Ontario Chapter

Chapter Activities



Cast Iron Testing Studied by Members of Central New York

By L. D. Wright,* Geneva, N. Y.

ONE of the first of the new Fall season meetings of A.F.A. chapters was held during September by the Central New York chapter, at Willard Straight Hall, Cornell University, Ithaca, N. Y. Some 55 members and guests attended, many driving considerable distances and taking advantage of the "car sharing plan" which has worked out unusually well in districts were gasoline is rationed. After dinner in the Terrace Room, the meeting adjourned to the East Mechanical Laboratory of the Engineering College, where a most interesting session was conducted.

At the last Spring meeting of the chapter, Prof. J. R. Moynihan, Associate Professor of Experimental Engineering at Cornell, addressed the group on mechanical testing of cast iron. This subject was followed up at the September meeting with a laboratory demonstration, carried out by Prof. Moynihan and Prof. J. O. Jeffrey, Sibley College of Cornell, assisted by L. L. Otto, G. W. Ehrhart and J. R. Young, instructors in engineering materials at the university. Informal discussion was conducted during the demonstration, with many questions on testing methods being clarified through the practical application of the testing equipment used.

*United States Radiator Corp., and Chairman, Central New York Chapter.

Twin City Chapter Talks Sand Problems

By O. W. Potter,* Minneapolis, Minn.

COMMENCING another season of meetings, 68 members and guests of the Twin City chapter met September 21 at the Coffman Memorial Union of the University of Minnesota, Minneapolis. Chapter Chairman Max Aker, Western Alloyed Steel Casting Co., Minneapolis, presided, and after a brief address of welcome introduced new members and guests.

The main program was divided into two sections, with H. W. Dietert, H. W. Dietert Co., Detroit, the interesting speaker the first part of the evening. Mr. Dietert showed motion pictures with his talk, on the subject of "The Effect of Pouring Temperatures on Molding Sand and Cores," with enthusiastic open discussion following the presentation.

The rest of the evening was devoted to round-table group discussions on non-ferrous, gray iron, steel, and pattern shop problems. Each group conducted its own informal session. E. D. Monney, Federated Metals division, American Smelting & Refining Co., led the discussion on silicon bronze for the non-ferrous group.

*University of Minnesota, and Secretary, Twin City chapter.

NEO Chapter Urged to Push Scrap Drive

By Edwin Bremer,* Cleveland, Ohio

SCRAP needs and foundry competition were the main subjects presented before the October 8 regular meeting of the Northeastern Ohio chapter of A.F.A., held at the Cleveland Club, Cleveland. Main speaker of the evening was J. C. Diebel, regional chief of the Industrial Salvage section, the Conserva-

*The Foundry, and Chairman, Publicity Committee, Northeastern Ohio chapter.

Random shots taken at the recent annual outing of the Detroit Chapter. Bottom Row, Left—Bob Crawford, chairman of the Outing Committee, returns to the clubhouse with members of his foursome, all somewhat damp. Bottom Row, Right—Fred J. Walls, International Nickel Co., Detroit, and a National director of A.F.A., poses with Chapter Chairman Fred A. Melmoth, Detroit Steel Castings Co.; Vic A. Crosby, Climax Molybdenum Co., and A.F.A. National Secretary R. E. Kennedy, Chicago.

(Photos courtesy F. A. Jensen, National Engineering Co.)

(Photos courtesy Sterling Farmer, Sand Products Corp.)

Photographs taken here and there during the October 8 regular meeting of the Northeastern Ohio chapter at the Cleveland Club, Cleveland. One of the main topics for the evening was the importance of the current scrap drive to continued war production.

tion division of WPB, Cleveland.

Mr. Diebel stressed the tremendous job involved in getting in all the scrap vitally needed for the war effort, stating that the present nationwide drive is essential for building up a backlog of supply to prevent possible winter shutdowns of war plants. He urged every individual to do his utmost to get out every possible pound of scrap. He mentioned that steel salesmen are being enlisted in the drive to visit industrial plants of all kinds, securing co-operation.

Offers Scrap Slogan

Following his talk, the speaker showed a film recording prepared by the National Association of Manufacturers in co-operation with WPB, entitled "Let's Get in the Scrap." Keynote of the film, insofar as deciding what materials should be scrapped, is this: "If it has not been used for three months, and will not be used in the next three months, scrap it!"

C. E. Westover, Executive Vice-President of A.F.A., Chicago, spoke and called attention to problems of competition after the war. He urged consideration be given the application of castings in general, since misapplication of any type of cast metal tends to give the entire industry a "black eye." Through co-operation of all foundries acting as an industry, he stated, the industry can maintain a strong post-war competitive position.

Birmingham Chapter Holds a Round Table on Raw Materials

By H. B. McLaurine,* Birmingham, Ala.

THE first regular monthly meeting of the new 1942-43 season was held by the Birmingham District chapter October 16 at the Tutwiler Hotel, Birmingham, with war production problems appropriately highlighted. With the general subject of "Raw Materials from the Procurement Angle" up for discussion, the meeting was conducted in the form of a round-table, in four sections.

Production foundry problems discussion was led by Warren Whitney, National Cast Iron Pipe Co. Group leader in discussion of steel foundry problems was C. P. Caldwell, Caldwell Foundry and Machine Co. Procurement questions facing the stove foundry group were conducted by Cliff Ackerson, Agricola Furnace Co., Gadsden, Ala., and the session on raw materials for non-ferrous founders was conducted by Chas. Wegelin, Dixie Bronze Co., Birmingham.

Seventh Annual Picnic

Some 450 members and guests of the Birmingham District chapter gathered at Pineview Beach on September 19 for the chapter's 7th annual picnic. The occasion provided many with the opportunity to take a few brief moments away from the high pressure of war production, and everyone made the most of it. Special commendation was given the entertainment committee, headed by Chairman W. G. Bagley, Republic Steel Corp., Birmingham, and Co-Chairman Jas. M. Bates, Moore-Handley Hardware Co. Other members of the committee were C. B. Saunders; W. J. Bach, Werner G. Smith Co.; F. K. Brown, Adams, Rowe & Norman, Inc.; S. B. Murray, A. B. C. Coal & Coke Co.; M. L. Hawkins, Stockham Pipe Fittings Co., and W. J. Bullock.

*Reporter, Birmingham District Chapter.

Chicago Learns About Inspection Problems

By F. E. Wartgow,* East Chicago, Ind.

RESUMING its regular schedule of meetings, 144 enthusiastic foundrymen, members and guests of the Chicago chapter, met at the Chicago Bar Association Restaurant, Chicago, on October 5. Guest speaker of the evening was John L. Graham, chief inspector, Pullman-Standard Car Mfg. Co., Hammond, Ind., who discussed "Inspection of and Specifications for War Materials."

The importance of the subject was thoroughly developed by Mr. Graham, who gave a brief resume of inspection work at

*American Steel Foundries, and Secretary of the Chicago Chapter.

the Pullman-Standard plant, how castings are received and the thorough inspection they receive through all stages of manufacture. One interesting point mentioned was the high degree of cooperation maintained between the plant and suppliers of castings in the event of possible defects. Mr. Graham constantly stressed the point that we need more production today and less scrap. He stated that while anyone can scrap a casting, it takes concentration to eliminate defects or salvage castings when such defects occur.

An unusual sidelight to Mr. Graham's talk was an account of his experiences in France in 1940 during the Nazi invasion, and the effort he went to in leaving the country ahead of the Germans.

Chesapeake Chapter Has Reese on Coke

By Frederick G. Bruggman,* Baltimore, Maryland

WITH newly-elected Chairman J. E. Crown, U. S. Navy Yard, Washington, D. C., presiding, the Chesapeake chapter opened its new Fall season with a meeting September 25 at the Engineers Club, Baltimore, with over 100 in attendance. Chairman Crown, in a short introductory talk, urged constant strong attendance by the members so that the activities of the chapter might progress.

The speaker for the evening, D. J. Reese, International Nickel Co., New York, then was introduced and devoted his time to discussion of cupola practice, with special emphasis on coke problems. Members were given cards on which they wrote a question of particular interest to them, and also guessed the weight of two pieces of by-product coke displayed by Mr. Reese. Winners in this unique contest were P. O. Ady, Washington Navy Yard, and M. J. Kelly, Kelso Mfg. Co., Baltimore.

Many constructive points dealing with coke in the cupola charge were developed by the speaker, including carbon control, weight of coke split, bed height, and quality and quantity of air required. Mr. Reese is chairman of the A.F.A. Cupola Research Committee, and in addition to his work with International Nickel is technical consultant for W.P.B. in charge of Steel and Iron Castings, Metallurgy and Specification section.

*Industrial Supply Corp., and Chapter Reporter, Chesapeake Chapter.

(Photos Courtesy F. G. Bruggman, Industrial Supply Corp.)

To and from the speakers platform at the September 25 meeting of the Chesapeake Chapter. Top Left—(left to right) Chapter Secretary L. H. Denton, Baltimore Assn. of Commerce; D. J. Reese, International Nickel Co., New York, guest speaker; E. W. Horlebein, Gibson & Kirk Co., Baltimore; Chairman J. E. Crown. Top Right—Don Reese talks about cupolas and coke. Bottom Left—Chapter Chairman J. E. Crown opens a new Fall season. Bottom Right (center)—M. J. Compty, Chicago Pneumatic Tool Co., Baltimore.

(Photos courtesy John Bing, A. P. Green Fire Brick Co.)

Two interesting views of personalities attending the September 18 meeting of the Wisconsin chapter, when honors were paid two men who have long served the industry. Top (left to right)—E. R. Young, Climax Molybdenum Co., Chicago; C. O. Thieme, H. Kramer & Co., Chicago; Dr. H. A. Schwartz, National Malleable & Steel Co., Cleveland; Dr. J. A. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala. Bottom (left to right)—C. E. Hoyt, Convention and Exhibits Manager, American Foundrymen's Association, Chicago, and retired A.F.A. President H. S. Simpson, National Engineering Co., Chicago, receive plaques "For Foundry Service" from retired Chapter President, A. C. Ziebell, Universal Foundry Co., Oshkosh, and present Chapter Chairman, Geo. K. Dreher, Ampco Metal, Inc., Milwaukee

Scrap Drive Is Topic of Wisconsin Men

By Geo. M. Pendergast,* Milwaukee, Wisconsin

IN THE present emergency 4,900 pounds of metal are required for every man serving in the American armed forces, whereas the ratio formerly was only 90 pounds per man, according to Wm. E. Simons, Deputy Regional Salvage Manager of WPB, in an address before a recent meeting of the Wisconsin chapter, at Hotel Schroeder, Milwaukee. Mr. Simons summarized results of the current nationwide scrap drive, and emphasized the present urgent need of greater salvage efforts brought about by the highly mechanized type of warfare now going on.

The speaker described the organization throughout Wisconsin of permanent committees in each county to supervise collection of industrial scrap, and

*Geo. M. Pendergast & Co., Inc., and Publicity Chairman of the Wisconsin chapter of A.F.A.

urged manufacturers to greater efforts in providing the needed materials. From the state's auto graveyards alone, he reported, 7,800 tons of scrap were gathered during September. The financial setup provided for recovery of scrap, where removal cost exceeds current scrap prices, also was described.

Training Within Industry Is Outlined to Michiana Chapter

THE first Fall meeting of the Michiana chapter was held October 5 at the LaSalle Hotel, South Bend, Ind., with between 80 and 90 members and guests present. Chapter Chairman H. Klouman, Michiana Products Corp., Michigan City, Ind., presided and introduced the important topic of the evening, that of training new foundry workers.

Invitation had previously been extended the Training Within Industry branch of the War Manpower Commission, to present information on the work it is doing to aid in training new workers for replacement of those called into service, as well as required by expanding production programs. C. C. Atwood and Herbert Kessel, assistant district representatives, W.M.C., Indianapolis, Ind., demonstrated how the Job Instructor Training program is being utilized to train instructors in war plants.

Mr. Kessel reviewed the relations of the division with industry, telling how the work was conceived and organized by prominent men of the country to fill a distinct need under wartime conditions. The Training Within Industry division has organized panel leaders in the various industrial centers, these leaders being recruited from plants of the district, the services of these men being available on request to any plant engaged in war production work.

Mr. Atwood described details of the training courses, which are for the purpose of giving instruction to plant staffs in the fundamentals of job instruction, and to all those who are engaged in breaking in new workers, in most cases beginners with no knowledge of the work to be performed. Wrong and right methods of instruction were demonstrated on volunteers from the audience, the simplicity and essential soundness of the method being brought home forcefully.

Discussion that followed the talks and demonstration brought out much information on how a plant executive can utilize the services of the Manpower Commission's training division. Those who attended the meeting were of the opinion that this training program should be brought to the attention of all foundrymen throughout the country. Chapters interested should contact their nearest representative of the Training Within Industry branch of the War Manpower Commission.

St. Louis Discusses Ordnance Castings

By J. H. Williamson,* St. Louis, Mo.

STRIKING a wartime note, Chapter Chairman C. B. Shanley, Semi-Steel Casting Co., St. Louis, at the October 8 meeting of the St. Louis District chapter, announced on instructions from the National office of A.F.A. in Chicago that all chapter members called into service will be carried on the rolls as active members. Before the meeting was adjourned, this note was struck again with the showing of several reels of war front news pictures.

Chairman Shanley introduced the new members of the chapter board of directors, as well as the chairmen of standing committees, after which prizes were awarded winners in last year's apprentice patternmakers' course. The following received cash prizes: 1st prize, Anthony Lebeck, Banner Iron Works; 2d prize, Joseph Schweider, General Steel Castings Corp.; 3d prize, Clarence Aerne, General Steel Castings Corp.

Guest speaker of the evening was Carl H. Morken, Carondelet Foundry Co., St. Louis, whose scheduled talk on "Cooling Reactions of Cast Iron" was changed to the subject of ordnance casting specifications by consent of the members present. Mr. Morken, calling on his experiences as consulting engineer in the Ordnance Department, brought forth considerable discussion relating to ordnance requirements of steel, iron and non-ferrous foundries.

*M. A. Bell Co., and Secretary-Treasurer, St. Louis District chapter.

Employee Co-operation Considered by Ontario

By G. L. White,* Toronto, Ont., Canada

WITH employer-employee relationships taking on new importance in the foundry industry today, the entire meeting of the Ontario chapter held September 25 at Hamilton, Ontario, was devoted to this subject. B. A. Trestrail, personnel director for John Inglis Co., Ltd., Toronto, was the speaker, stating that whereas raw materials and production methods were the first concern in Canada less than a year ago, today the business of getting along with employees is assuming top importance.

Mr. Trestrail pointed out that one of the biggest industrial problems of today results from enormous expansion in the number of employees and large labor turnover that frequently exists. However, he said, it has been shown that a sound, sensible and simple employer-employee relationship plan will be readily accepted by the workers. Several instances were cited where employees have backed soundly organized plans strongly, with employee committees.

During the meeting Chairman J. J. McFayden, Galt Malleable Iron Co., Ltd., Galt, Ont., called for a minute of silence in tribute

*Westman Publications, Ltd., and Secretary-Treasurer of Ontario chapter.

to the men from the Midland Foundry, Midland, Ont., who lost their lives in the recent boat disaster in Georgian Bay.

Annual Chapter Picnic

The Fall season of the Ontario chapter was officially opened with the annual picnic, held August 22 at Barnesdale, the estate of Rolph Barnes, Wm. R. Barnes Co., Ltd., at Waterdown, Ont. Golf, horseshoes and other outdoor diversions occupied the day, followed by a buffet supper, entertainment and awarding of prizes in the evening. Foundrymen attended from as far as Orillia, Bowmanville, Galt and Niagara Falls.

Pat Dwyer Addresses Central Indiana Men

By Ralph A. Thompson,* Indianapolis, Indiana

GATHERING at the Washington Hotel, Indianapolis, on October 5, 100 members and guests of the Central Indiana chapter of A.F.A. started a new Fall season of regular meetings with an interesting talk on practical foundry practice. Chairman B. P. Mulcahy, Citizens Gas & Coke Utility, Indianapolis, presided.

Technical Chairman R. H. Bancroft, Perfect Circles Co., New Castle, Ind., had the honor of introducing the guest speaker, Pat Dwyer, *The Foundry*, Cleveland, Ohio, who spoke on a subject with which he has had a world of experience: "Gates and All That There Kind of Stuff." In his entertaining and interesting way, Mr. Dwyer cited many examples out of his experience to illustrate his talk, and afterward answered a number of questions put to him by his audience.

*Electric Steel Castings Co., and Secretary, Central Indiana Chapter.

Second Annual Outing Held

Several hundred foundrymen from Indianapolis and surrounding territory took a little "time out" on September 12 for the Central Indiana chapter's 2d annual outing, held at the Lake Shore Country Club. Activities for the affair were arranged and conducted smoothly by A. E. Murphy, Hickman Williams & Co., Indianapolis, as general chairman of the committee, and E. G. Schmidt, International Harvester Co., Indianapolis.

Metropolitan Group Talks of War Effort

By R. E. Ward,* Bendix, N. J.

PRIORITIES, substitutions and metal shortages were the timely subjects discussed at the September 21st meeting of the Metropolitan chapter of the Association, held at the Essex House, Newark, N. J. Chairman F. G. Sefing, International Nickel Co., Inc., New York, presided, and Vice-Chairman K. V. Wheeler, American Steel Castings Co., Newark, introduced the guest speaker, Col. Roy M. Jones, head of the Eastern procurement branch, U. S. Army Air Forces.

Colonel Jones, pointing out the tremendous production job ahead of American industry, stated that every effort should be made to use substitute materials for aluminum and magnesium for the present, but that new plants now under construction may relieve the situation in the nearby future. He also stressed the fact that more women must be introduced to industry, especially for jobs of a repetitive nature, and recommended that employers familiarize themselves now with the problems of women employees, such as clothing, guards, etc.

In closing, the speaker offered the services of his department in helping local foundrymen, especially those contracted to the Air Forces, to interpret procedures of Government priority regulations.

*Eclipse Aviation Div., Bendix Aviation Corp., and Chairman, Publicity Committee for Metropolitan Chapter of A.F.A.

(Photos courtesy J. P. Lentz, International Harvester Co.)

Evidence of under-cover work by a Candid Cameraman at the Central Indiana Chapter's 2d annual outing, September 12. Top Row, Left to Right,—(1) Chairman Mulcahy, Emil Schmidt, L. C. Snyder (Hickman Williams & Co., Cincinnati) and Henry Brown (Golden Foundry Co., Columbus, Ind.) get into the spirit of the thing. (2 and 4) Baseball action and arguing. (3) J. C. Gore, Werner G. Smith Co., Chicago, and L. C. Rasmussen, International Harvester Co., Indianapolis, harmonize. Bottom Row, Left to Right—(1) Chairman Mulcahy made the only speech of the day. (2) "Senator" Gore autographs. (3) Distributing the prizes.

West Michigan Sees Dietert Sand Films

By K. C. McCready,* Sparta, Mich.

OPENING the 1942-43 season of regular meetings October 5 at the Ferry Hotel, Grand Haven, Mich., 81 members and guests of the Western Michigan chapter of A.F.A. found an excellent program awaiting them. Chairman C. J. Lonnee, Muskegon Piston Ring Co., Sparta, Mich., opened the meeting, hearing first the report of the recent picnic by C. H. Cousineau, West Michigan Steel Foundry Co., Muskegon, Mich.

Don F. Seyferth, West Michigan Steel Foundry Co., Muskegon, as program chairman introduced the speaker of the evening, Harry W. Dietert, Harry W. Dietert Co., Detroit. Mr. Dietert presented three reels of films dealing with high temperature sand control in a unique and illuminating manner. One reel covered high temperature control of molding and core sands; another, breakdown tests on cores; the third, control and measurements of the hot strength of molding sands. Brief discussion followed the showing of each reel, with an interesting general discussion at the end of the presentation.

*Muskegon Piston Ring Co., and Secretary, Western Michigan Chapter.

Western New York Hears Talk on Today's Gray Iron Problems

By J. P. Wark,* Buffalo, N. Y.

BEGINNING its Fall season with a capacity crowd of members and friends, the Western New York chapter held its first 1942-43 meeting at the Hotel Touraine, Buffalo. Chairman R. T. Rycroft, Jewell Alloy & Malleable Co., Inc., Buffalo, presided and introduced Fred G. Sefing, International Nickel Co., Inc., New York, Chairman of the Metropolitan chapter, as the evening's guest speaker.

Mr. Sefing chose as his subject "Today's Gray Iron Foundry Problems," dealing principally with control of analysis of metal, control of melting practice, and pouring and control of molding. He stated that the main problem of today is to get along with poor scrap, low grades of coke, fewer alloys and less time under conditions of exact specifications. In summary Mr. Sefing stated that casting success depends upon close control, that the best foundryman pays closest attention to these details.

The chapter inaugurated an addition to its program, the question period, which it is expected will soon prove one of the most popular elements of future meetings.

*Queen City Sand & Supply Co., and Secretary of Buffalo chapter.

Glass Paid Tribute

Chairman Rycroft called attention to the fine administration rendered by retiring Chairman R. K. (Bob) Glass, Republic Steel Corp., Buffalo, who was unable to be present because of illness. Bob Glass' untiring efforts not only while chairman but through all the years he has been associated with the chapter, have contributed greatly to the organization's present high standing. The membership responded with a rising tribute of thanks, and Secretary Wark was directed to convey the appreciation of the chapter to Mr. Glass.

Philadelphia's Topic: Core Baking Practice

By Wm. S. Thomas,* Philadelphia, Pa.

WITH 125 members and guests present and accounted for, the Philadelphia chapter swung into its new season with a regular meeting October 9 at the Engineers Club, Philadelphia. Chairman D. J. Peake, Florence Pipe Foundry & Machine Co., Florence, N. J., presided. Following his address of welcome as the recently elected chairman, Mr. Peake introduced "The Navy" in the person of Chief Boatswain Mate Robinson, who presented three inspiring motion pictures depicting the extensive training given Naval aviation cadets.

Getting back to foundry business, Technical Chairman John A. Sweeney, Florence Pipe Foundry & Machine Co., presented the guest speaker, Emile Pragoff, Jr., Hercules Powder Co., Wilmington, Dela. Mr. Pragoff offered a most interesting talk on "Core Baking Theory and Practice," illustrating his subject with charts and blackboard, pointing out the best baking temperatures of sands with various types of binders.

*North Bros. Mfg. Co., and Chairman of Publicity Committee for the Philadelphia Chapter of A.F.A.

Northern California "Patternmakers' Nite"

By Geo. L. Kennard,* San Francisco, California

MEMBERS of the Northern California chapter of the Association responded to a special call for a "Pattern Makers" program September 11 with an attendance of 84, including a number of pattern shop operators and journeymen pattern makers. The meeting was held in the Athens Club, Oakland, Calif., Chapter Chairman Fred A. Mainzer, Pacific Brass Foundry of San Francisco, San Francisco, presiding.

Guest speaker of the occasion was E. T. Kindt, Kindt Collins Co., Cleveland, Ohio, who offered a thorough discussion on kinds and grades of pattern lumber, selection and treatment, seasoning, care and storage, and humidity control as used in large pattern shops to preserve the accuracy necessary for production of perfect castings in war production work. Mr. Kindt, illustrating his talk with slides, blow-up projections and motion pictures, explained the use of modern pattern shop equipment for labor saving and intricate work.

Serge P. Kovaleff, Enterprise Engine & Foundry Co., San Francisco, as program chairman, outlined the schedule of meetings and subjects arranged for the Fall season.

*Northern California Foundrymen's Institute, and Secretary-Treasurer of Northern California chapter of A.F.A.

Abstracts

NOTE: The following references to articles dealing with the many phases of the foundry industry, have been prepared by the staff of *American Foundryman*, from current technical and trade publications.

When copies of the complete articles are desired, photostat copies may be obtained from the Engineering Societies Library, 29 W. 39th Street, New York, New York.

Aluminum Alloy

(See Radiography.)

Cast Iron

FLAME HARDENING. *"Flame Hardened Cast Iron as a Substitute Material,"* A. L. Hartley, *Pig Iron Rough Notes,* Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., No. 89, Summer 1942, pp. 21-28. Because selection of suitable substitute materials is of vital importance today, it should be remembered that flame-hardened alloy cast iron parts are found in many modern machines, replacing steel parts. Only reasonable foundry practice and very small alloy additions are necessary to produce cast iron having a tensile strength in excess of 50,000 lbs. per sq. in. and a Brinell of 187-223. Flame hardening may be accomplished in several ways, each of which is described briefly: Spot hardening, spin hardening, progressive hardening, spiral progressive hardening, combination spinning and progressive hardening. Equipment for and methods of flame hardening are described and illustrated, and analyses of irons suitable for the process are given.

SCRAP. *"Unusual Elements in Gray Cast Iron,"* J. T. MacKenzie, *Pig Iron Rough Notes,* Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., No. 89, Summer 1942, pp. 7-9. In these days of high scrap mixtures "or else," foundrymen are likely to find all sorts of strange elements going into furnaces. Fortunately, in most cases these elements are in extremely small percentages of the total weight of the scrap pile, and a large proportion pass harmlessly out in gases or slag. Some have little or no effect on the iron in small quantities, and some are decidedly beneficial. Among the worst, however, are antimony, arsenic, bismuth, lead, tin and zinc, and most of these come from bearing metals, enamels, paints and coatings with bearing metals. Effects of these elements on iron are described with analyses of irons resulting. In the present enforced use of high scrap mixtures, not only are such elements a nuisance to foundrymen but they are desperately needed for their proper use in the war effort. Consequently, all possible precautions should be used to remove them from scrap piles and place them in proper hands for effective disposal.

Fuel

(See Furnace Practice.)

Furnace Practice

PULVERIZED COAL. *"Pulverized Coal," Steel,* vol. 110, No. 22, June 1, 1942, pp. 62-63, 98-101. Application of pulverized coal to furnaces which can use this fuel will release important supplies of gas or oil for the many heat-treating and other low-temperature furnaces that cannot utilize coal. From long years of experience a technique has been developed for making pulverized coal, for many purposes the equal of natural gas or fuel oil. Problems that had to be solved in the preparation, handling and burning of pulverized coal, each of which are discussed, are: (1) Combustion principles, (2) uniformity and fineness of pulverization, (3) dry storage, (4) method of transport to burners, (5) burner design, (6) adaptation of the furnace to the fuel, (7) provision for accumulating and removing ash, and (8) complete automatic control of grinding, fuel-air ratio, and fuel supply from electric potentiometer temperature control.

Management

JOB EVALUATION. *"Job Evaluation for Hourly and Salaried Workers,"* Asa S. Knowles, *Supervision,* vol. 4, No. 8, August 1942, pp. 13-14. The first task in job evaluation work involves job analysis, including (1) collecting facts about jobs, (2) writing detailed descriptions on the basis of facts collected, and (3) preparing specifications or brief definitions of job requirements. Job analysis is really the backbone of job evaluation. In collecting facts, it is essential first to obtain the cooperation of all employees involved. Once the job facts are collected, job descriptions are prepared with a view to explaining in detail what the job requires. Sufficient work in the field of job evaluation has now been done so that firms just starting programs can anticipate in advance the common factors most likely to be used in the final program for rating jobs. Completed descriptions are sent to the wage and salary unit of a company. A comparison of the point of view of the employee with that of the employer as revealed by department heads or supervisors, contributes much to making fair descriptions.

Manganese

CONSERVATION. *(See Steel.)*

Mortar Shells

(See Steel.)

Non-Ferrous

ALUMINUM ALLOY. *(See Radiography.)*

TIN CONSERVATION. *"Meeting the Tin Problem,"* Geo. F. Beard, *Canadian Metals and Metallurgical Industries,* vol. 5, No. 9, September 1942, pp. 277, 289. Review of progress in reducing the use of tin in various products, such as tin solders, and bearing metals. More research has been carried out on solders and alternates in the past 12 months than in the previous 12 years, and much useful information is being developed. Some can manufacturers have used tinless solders successfully, and the U. S. Navy has standardized on an all-purpose solder with only 20 per cent tin. Radiator cores have been successfully dipped with as little as 2 per cent tin in the solder bath. Today bearing materials are being made with from 0 to 15 per cent tin, and in babbit bearings the thickness of the babbit often can be reduced to conserve tin. Manufacturers of collapsible tubes, formerly almost pure tin, have made great strides. Tin in bronze has been cut tremendously. Gun metal is rapidly being replaced by silicon-bronze mixtures, which have been found superior to gun metal for structural bronze and, in many cases, for hydrostatic pressure work.

Radiography

AIRCRAFT CASTINGS. *"A Study of Secondary Radiation in Relation to the Radiography of Aircraft Castings,"* L. W. Ball, *Bulletin* of American Society of Testing Materials, No. 115, March 1942, pp. 27-33. In radiography of aircraft castings, precision in the control of each factor of the X-ray procedure can be attained even under mass-production conditions, through full utilization of the "technique film" method. The technique is applied to the pilot casting and when approved by competent authority the technique film and a corresponding technique form are filed so that all subsequent radiography of the pattern is an automatic routine. The paper illustrates how the effects of secondary radiation can be taken into account when preparing technique films, thus avoiding inspection failures. Results are given only for aluminum alloy and one particular X-ray apparatus. The experimental methods now are being applied to magnesium and steel, results to be published at later date.

Scrap

(See Cast Iron.)

Steel

MANGANESE CONSERVATION. *"Conservation of Manganese by Steel Makers," Metal Progress,* vol. 41, No. 5, May 1942, pp. 647-650, 698. Report of committee of American Iron and Steel Institute appointed to develop specific recommendations for manganese conservation and to obtain support of the steel industry and its customers. For purposes of the report, steels are divided into three classes: Class A, products in which manganese content of steel can be reduced with little or no effect on production rate or quality of the steel; Class B, products in which manganese content may be reduced with a probable adverse effect on both production and quality; Class C, products in which, if manganese contents were reduced, definite effects on both production rate and quality of the steel would be expected. Committee recommendations in regard to reduction of manganese content: Class A, (including high manganese sheet steel,

some of commercial high manganese steel rails, bars, much of sheet and strip steel plates, etc.) could be reduced, effecting saving of 10 per cent of total ferromanganese; Class B (including tinplate, some grades of tubing, rods, wire, sheet and strip) could be reduced if need great enough to warrant adverse effect, effecting saving of another 10 per cent of ferromanganese; careful consideration of problem by both producer and consumer before making reductions.

MORTAR SHELLS. *"Cast Mortar Shells,"* J. B. Nealey, *Iron Age,* vol. 150, No. 7, August 13, 1942, pp. 47-52. Hitherto the casting technique has been limited largely to mortar shells using a relatively small propellant charge compared with long-range artillery shells. A large malleable and steel foundry, working with the U. S. Ordnance Department, developed an electric furnace steel and process for casting high-explosive mortar shells successfully. Physical characteristics rather than chemical analyses were guiding factors in determining the type of steel used. After many steels and heat treatments were tried and discarded, the steel developed is so heat treated as to produce maximum ductility, having a minimum yield point of 35,000 lbs. per sq. in., elongation of 30 per cent in 2 in., and reduction of area of 50 per cent. Standard foundry practice is used, with few variations. As a result it is stated that casting offers distinct possibilities for producing high-explosive shells, offering considerable economy in time, labor and material. A single casting unit is described of three molding machines and auxiliary equipment, unit being capable of turning out 9,000-10,000 shells per 24-hour day. However, it is essential that superior foundry technique be employed, since porosity not detectable in factory inspection might prove dangerous in firing short-barrel mortars.

Testing

SAMPLING TEST PIECES. *"A Method of Sampling for Metallurgical Test Pieces,"* C. T. Eakin, *Metal Progress,* vol. 42, No. 2, August 1942, pp. 207-208. In the race to increase production yet maintain quality, engineers, inspectors and others are often called upon to accept or reject castings or wrought parts with inadequate information concerning the metal or samples for testing it. A core drill is described, said to fulfill the need for a practical tool for sampling large pieces simply and rapidly, yet without impairing the usefulness of the piece for its intended purpose. The drill consists essentially of a tubular member having a number of cutting teeth at one end and a removable centering device inside the tube consisting of a pin and a spring. It can be used in an ordinary drill chuck and operated in a stationary drill press or a portable air, electric or hand drill. Size of the drill may be varied to suit the purposes of the test and kind and amount of available material. With drills of suitable size, tensile tests may be made from the core, but in most cases the information from the microstructure plus the approximate tensile strength indicated by results of the hardness test, is sufficient.

Training

FOREMAN. *"Foreman Qualifications in War Industry,"* by Richard S. Schultz, *Supervision,* vol. 4, No. 5, May, 1942, pp. 6-7. More new supervisors are needed in war industries, and increasing responsibilities are being faced by present supervisory personnel. Qualifications of a good foreman are detailed for experienced foremen as well as new foremen.

Statement of Ownership

Statement of the ownership, management, circulation, etc., required by the acts of Congress of August 24, 1912, and March 3, 1933, of *American Foundryman,* American Foundrymen's Association, published monthly at Chicago, Ill., for October 1, 1942. State of Illinois, County of Cook, ss. Before me, a notary public in and for the state and county aforesaid, personally appeared R. E. Kennedy, who, having been duly sworn according to law, deposes and says that he is the Editor of the *American Foundryman,* American Foundrymen's Association, and that the following is, to the best of his knowledge and

November Chapter Meeting Schedule

November 2
Central Indiana
Washington Hotel, Indianapolis
H. W. DIETERT,
Harry W. Dietert Co.
"The Behavior of Sand and Cores in the Mold at Pouring Temperatures"

✦ ✦

November 2
Chicago
Chicago Bar Assn. Restaurant
ROUND-TABLE MEETINGS
Steel—*Melting by Triplex Method.*
Gray Iron—*Casting Defects.*
Malleable—*Effect of Scarcity of Preferred Melting Stock.*
Non-Ferrous—*Silicon Bronzes.*
Pattern—*Apprentice Contest Work.*

✦ ✦

November 2
Metropolitan
Essex House, Newark, N. J.
WM. ROSE,
Wright Aeronautical Corp.
"Foundry Sands—Types, Testing and Reclamation"

✦ ✦

November 2
Western Michigan
Perry Hotel, Grand Haven, Mich.
STANLEY DAVIS, Campbell Wyant & Cannon Foundry Co.
"Practical Use of X-Ray Equipment"

✦ ✦

November 6
Western New York
Hotel Touraine, Buffalo
H. W. DIETERT,
H. W. Dietert Co., Detroit
"Relationship Between Casting Defects and Behavior of Sand at Elevated Temperatures"

November 12
Northeastern Ohio
Cleveland Club, Cleveland
DR. W. E. WICKENDEN,
Case School of Applied Science
"Engineering Problems in The Foundry Industry"

✦ ✦

November 12
St. Louis District
De Soto Hotel, St. Louis.
A. W. GREGG, Whiting Corp.
"Triplex Melting for Steel Castings"

✦ ✦

November 13
Philadelphia
Engineers Club, Philadelphia
S. H. BULLARD,
Bullard Machine Co.
"Present Day Methods of Gray Iron Foundry Operations"

✦ ✦

November 13
Toledo
"Pattern Making—Its Relation to the Foundry"

✦ ✦

November 16
Cincinnati
Cincinnati Club
MAX KUNIANSKY,
Lynchburg Foundry Co.
"Use of Scrap Iron in the Foundry"
WM. FRANK,
Campbell Hausfeld Co.
"Melting Non-Ferrous Alloys"

✦ ✦

November 16
Twin City
University of Minneapolis, Minneapolis
B. P. MULCAHY,
Citizens Gas & Coke Utility
"Cupola Operation"

November 19
Detroit
Rackham Educational Memorial
ROUND-TABLE DISCUSSIONS
Aluminum—Brass and Bronze
Steel—Gray Iron

✦ ✦

November 19
Eastern Canada and Newfoundland
Mount Royal Hotel, Montreal, Que.

✦ ✦

November 20
Northern California
Engineers Club, San Francisco
C. B. TIBBETTS,
Los Angeles Steel Casting Co., Ltd.

✦ ✦

November 27
Northern California
Athens Club, Oakland
H. W. DIETERT,
Harry W. Dietert Co.
"High Temperature Properties of Sand"

✦ ✦

November 20
Southern California
Elks Club, Los Angeles

✦ ✦

December 7
Chicago
Chicago Bar Assn. Restaurant
A. R. BLACKBURN,
Ohio Experiment Station
"Chemistry of Refractories"

✦ ✦

December 7
Metropolitan
Essex House, Newark, N. J.
SAM TOUR,
Lucius Pitkin, Inc.
"Substitutions for Critical Foundry Alloys"

belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to-wit: 1—That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Foundrymen's Association, Inc., Chicago, Ill.; Editor, R. E. Kennedy, Chicago, Ill.; Managing Editor, N. F. Hindle, Chicago, Ill.; Business Managers, None. 2—That the owner is American Foundrymen's Association, Inc., not for profit; stock, none. Principal Officers, D. P. Forbes, Gunite Foundries Corp., Rockford, Ill.; C. E. Westover, Executive Vice President, Chicago, Ill.; R. E. Kennedy, Secretary, Chicago, Ill. 3—That the known bondholders, mortagagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None 4—That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. R. E. Kennedy, editor. Sworn to and subscribed before me this 25th day of Sept. 1942. (Seal) Jennie Reininga, Notary Public. (My commission expires Feb. 9, 1946.)

War Problems Committees of A.F.A. Chapters

Chesapeake

Chairman, E. W. Horlebein,
The Gibson & Kirk Co., Baltimore, Md.

Chicago

Chairman, E. R. Young,
Climax Molybdenum Co.

Vice-Chairman, L. L. Henkel,
War Production Board

Secretary, N. F. Hindle,
American Foundrymen's Assn.

Non-Ferrous

H. M. St. John, Crane Co.

C. K. Faunt, Christensen & Olsen Foundry Co.

Steel

L. H. Hahn, Sivyer Steel Casting Co.

F. S. Sutherland, Continental Roll & Steel Foundry Co., East Chicago, Indiana.

Malleable

L. J. Wise, Chicago Malleable Castings Co.

W. D. McMillan, International Harvester Co., McCormick Works.

Cast Iron

L. H. Rudesill, Griffin Wheel Co.

J. H. Gellert, Nichol-Straight Foundry Co.

Aluminum

G. H. Starmann, Apex Smelting Co.

Magnesium

G. H. Curtis, Chrysler Corp., Dodge Chicago Plant.

Cincinnati

Chairman, Stanton T. Olinger,
Cincinnati Gas & Electric Co.

Gray Iron

Jos. Schumacker, Cincinnati Milling Machine Co.

Non-Ferrous

Ed. Korten, Reliable Pattern & Foundry Co.

Pattern Making

Charles Appel, The Lunkenheimer Co.

Alloys

Earl Kindinger, Williams & Co., Inc.

Pig Iron

Robt. Ebersole, Miller & Co.

Scrap Iron

L. W. Pryse, Hickman Williams & Co.

Steel

J. B. Caine, Sawbrook Steel Castings Co.

Detroit

Chairman, F. A. Melmoth,
Detroit Steel Casting Co.

Steel

Ernest Lancashire, Detroit Steel Casting Co.

R. J. Wilcox, Michigan Steel Casting Co.

Gray Iron

V. A. Crosby, Climax Molybdenum Co.

L. W. Thayer, Cadillac Motor Car Div.

Malleable

C. F. Joseph, Saginaw Malleable Iron Div., Saginaw, Mich.

G. L. Galmish, Michigan Malleable Iron Co.

Aluminum & Magnesium

M. E. Brooks, Dowmetal Foundry, Bay City, Mich.

Brass & Bronze

J. P. Carritte, Jr., True Alloys, Inc.

Metropolitan

Chairman, J. S. Vanick,
International Nickel Co., New York.

Aluminum, Magnesium, Light Metals

R. E. Ward, Bendix Aviation Corp., Bendix, N. J.

Steel

K. V. Wheeler, American Steel Castings Co., Newark, N. J.

Brass & Non-Ferrous Foundry

D. E. Broggi, Neptune Meter Co., Long Island City, N. Y.

Brass & Non-Ferrous Castings

S. Frankel, H. Kramer & Co., New York.

Pig Iron

N. Anderson, Debevoise-Anderson Co., New York.

Cupola Practice & Foundry Equipment

H. A. Deane, American Brake Shoe & Foundry Co., Mahwah, N. J.

D. J. Reese, International Nickel Co., New York.

Pressure Castings

R. J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J.

Gating & Risering Small Castings

W. T. Dette, Robins Conveying Belt Co., Passaic, N. J.

Gating & Risering Heavy Gray Iron Castings

J. W. Reid, R. Hoe & Co., Dunnellen, N. J.

David MacIntosh, Sacks-Barlow Foundries, Inc., Newark, N. J.

Cores, Sand, Refractories

W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J.

Government Specifications

N. A. Kahn, U. S. Navy Yard, Brooklyn, N. Y.

Heat-Resisting Alloy Castings

E. Cook, American Brake Shoe & Foundry Co., Mahwah, N. J.

Quad City

Chairman, P. T. Bancroft,
Republic Coal & Coke Co., Moline, Ill.

A. H. Putnam, A. H. Putnam Co., Rock Island, Ill.

C. F. Burgston, Deere & Co., Moline.

W. E. Jones, Ordnance Steel Foundry, Bettendorf, Iowa.

C. S. Humphrey, C. S. Humphrey Co., Moline.

John Diedrich, Blackhawk Foundry & Machine Co., Davenport, Iowa.

St. Louis

Chairman, C. B. Shanley,
Semi-Steel Casting Co., St. Louis, Mo.

L. C. Farquhar, American Steel Foundries, East St. Louis, Ill.

W. E. Illig, Banner Iron Works, St. Louis.

A. O. Nilles, Griffin Wheel Co., North Kansas City, Kans.

F. O'Hare, Central Brass & Aluminum Foundry, St. Louis.

L. J. Desparois, Pickands Mather & Co., St. Louis.

E. A. Goerger, City Pattern & Model Co., St. Louis.

H. Goodwin, Medart Co., St. Louis.

W. L. Kammerer, Midvale Mining & Mfg. Co., St. Louis.

F. B. Riggan, Key Co., E. St. Louis, Ill

G. W. Mitsch, American Car & Foundry Co., St. Louis.

Jas. Roland, Fry-Fulton Lumber Co., St. Louis.

W. A. Zeis, Midwest Foundry & Supply Co., Edwardsville, Ill.

Western New York

Chairman, Wm. S. Miller,
Chas. C. Kawin Co., Buffalo, N. Y.

Gray Iron

Alex Rankin, Lake Erie Engineering Corp., Kenmore, N. Y.

M. W. Pohlman, Pohlman Foundry Co., Inc., Buffalo.

Malleable

J. W. Considine, Jewell Alloy & Malleable Co., Inc., Buffalo.

F. J. Wurscher, Acme Steel & Malleable Iron Works, Buffalo.

Steel

J. P. Begley, Pratt & Letchworth Co., Buffalo.

J. H. Sander, American Radiator & Standard Sanitary Corp., Buffalo.

Non-Ferrous

J. C. McCallum, McCallum-Hatch Bronze Co., Buffalo.

H. R. King, Metal & Alloy Specialties Co., Inc., Buffalo.

The Answer to War Production Problems---"IMPROVE Through LEARNING"

Progressive foundries are making every effort to increase the skills of their present employees, and to train new men and women, by keeping them better informed about their jobs. Many plants are maintaining up-to-date technical libraries so that their employees may "Improve Through Learning"—and these libraries invariably include the A.F.A. Bound Volumes of *"Transactions."*

These Bound Volumes contain a vast amount of valuable, authoritative data on every branch of the casting industry—Steel, Malleable, Non-Ferrous, Gray Iron—prepared by recognized authorities on foundry research and practice. These men know that *better informed employees* and *better production* go hand in hand.

Start a personal and plant library—or build up your present fund of information—with these Bound Volumes. We have to KNOW to WIN!

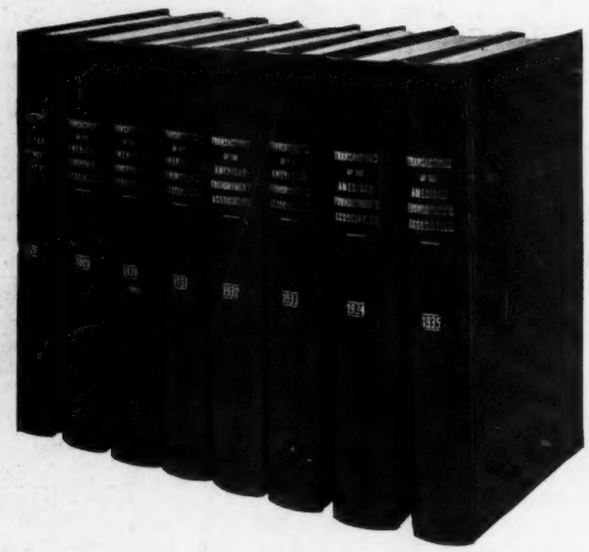
VOLUMES AVAILABLE

No. 49—1,039 pages
No. 48— 815 pages
No. 47—1,030 pages
No. 46— 950 pages

PRICE

$3.00 Each to A.F.A. Members

$15.00 Each to Non-Members



★ INDEX to Vols. 38-48 Inclus. $1.00. (FREE with Each SET of Vols. 46-49 Ordered)

A Few of the Subjects in Volumes 46-49

Fluidity of Iron and Steel.
Welding Cast Steel.
Chaplets and Steel Casting.
Converter Steel Practice.
High-Strength Cast Steels.
Copper-Bearing Steels.
Steel Foundry Refractories.
Steel Furnace Practice.

Foundry Sand Storage.
Foundry Sand Control Program.
Clay Bonding of Molding Sands.
Resin Bonded Cores.
Foundry Ladle Refractories.
Synthetic Sand Practice.

Foundry Cost Factors.
Time Study for Foundries.
Apprentice Training.
Foreman Training.
Job Evaluation Studies.
Expense Control and Budgets.
Foundry Maintenance Problems.
Pattern Shop Developments.
Wood Pattern Coatings.

High-Test and Alloy Irons.
Cupola Melting, Refractories.
Heat Treatment of Cast Iron.
Gray Iron Casting Defects.
Desulphurizing Cast Iron.
Graphitization of Cast Iron.
Hardening and Tempering Iron.

Non-Ferrous Foundry Defects.
Magnesium Castings Practice.
Melting Copper-Base Alloys.
High-Lead Bronze Practice.
Cast Red Brasses.
Aluminum Casting Alloys.
Bronze Pressure Castings.
Silicon in Non-Ferrous Work.
Porosity and Leakage.
Sand Cast Manganese Bronze.

Flame Hardening Malleable.
Malleable Foundry Molding.
Inverse Chill in Malleable.
Atmosphere Control in Annealing.
Short Cycle Malleable Iron.
Duplexing of Malleable.
Malleable Iron Heat Treatment.

AMERICAN FOUNDRYMEN'S ASSOCIATION
222 West Adams St., Chicago, Ill.

MAIL COUPON TODAY
Dept. NO-1

Please send me A.F.A. Bound Volumes of "Transactions" checked below.

☐ **Vol. 46** ☐ **Vol. 47** ☐ **Vol. 48** ☐ **Vol. 49**

($3.00 each to A.F.A. Members, $15.00 each to Non-Members)

☐ **Index to Vols. 38-48.**

Name .....

Company .....

Address ..... **City** ..... **State** .....

I enclose ☐ **Check** ☐ **Money Order** ☐ **Cash for $**..... **to cover cost.**